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HEAVY DUTY FUEL ECONOMY PROGRAM PHASE II - EVALUATION OF EMISSION CONTROL TECHNOLOGY APPROACHES

U.S. ENVIRONMENTAL PROTECTION AGENCY
Office of Air and Waste Management
Office of Mobile Source Air Pollution Control
Emission Control Technology Division
Ann Arbor, Michigan 48105

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This report describes the laboratory effort toward reducing emission and fuel consumption in a heavy-duty gasoline engine, while retaining current durability performance. The goals were HC plus NOx of 6.7 g/kW-hr (5g/bhp-hr) CO of 33.5 g/kW-hr (25 g/bhp-hr), a ten percent reduction in specific fuel consumption and 1500 hours of service accumulation, using the procedures proposed for the 1979 model year. The initial laboratory evaluations involved standard carburetors, a Dresserator inductor, a Bendix electronic fuel injection system, exhaust manifold thermal reactors, exhaust gas recirculation along with a number of other engine emissions control components and operating parameters. Based on the project goals and the initial results, a system was selected to undergo final optimization and service accumulation. The system selected consisted of electronic fuel injection, thermal reactors with air injection, exhaust gas recirculation and a high energy ignition system with vacuum advance. This system met the emissions and specific fuel consumption goals and completed 1500 hours of service accumulation.
During the last 750 hours of service accumulation, a heavy-duty oxidation catalyst was included in the exhaust system as an add-on to the optimized system. Subsequent to the 1500 hours of service accumulation, this engine was installed into a heavy-duty truck for an evaluation of driveability and performance.

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Publication No. EPA-460/3-77-010

ABSTRACT

This report describes the laboratory effort toward reducing emissions and fuel consumption in a heavy-duty gasoline engine, while retaining current durability performance. The goals were HC plus NO_x of 6.7 g/kW-hr, CO of 33.5 g/kW-hr, a ten percent reduction in specific fuel consumption and 1500 hours of service accumulation, using the procedures proposed for the 1979 model year. The initial laboratory evaluations involved standard carburetors, a Dresserator inductor, a Bendix electronic fuel injection system, exhaust manifold thermal reactors, exhaust gas recirculation along with a number of other engine emissions control components and operating parameters. Based on the project goals and the initial results, a system was selected to undergo final optimization and service accumulation. The system selected consisted of electronic fuel injection, thermal reactors with air injection, exhaust gas recirculation and a high energy ignition system with vacuum advance. This system met the emissions and specific fuel consumption goals and completed 1500 hours of service accumulation. During the last 750 hours of service accumulation, a heavy-duty oxidation catalyst was included in the exhaust system as an add-on to the optimized system. Subsequent to the 1500 hours of service accumulation, this engine was installed into a heavy-duty truck for an evaluation of driveability and performance.

FOREWORD

This project, involving two separate phases, was initiated by the Division of Emissions Control Technology, Environmental Protection Agency, 2565 Plymouth Road, Ann Arbor, Michigan 48105. Phase I, which involved an analysis of heavy-duty vehicle operating data from several sources, has been discussed in a separate final report (EPA-460/3-77-001) and is only briefly summarized in this report. The Phase II evaluations, identified as Southwest Research Institute project 11-4311-002, are discussed in this report. The engineering effort on which this report is based was accomplished by the Department of Emissions Research of Southwest Research Institute, 6220 Culebra Road, San Antonio, Texas. This project, authorized by Contract 68-03-2220, began on June 30, 1975 and was completed July 30, 1977.

The SwRI Project Leader was Mr. Charles Urban who supervised all work conducted in this project. The Lead Technicians on this project were Mr. Robert Howard during the optimization phase and Mr. Eddie Grinstead during the service accumulation evaluation. Mr. Robert Srubar provided engineering assistance in conducting the service accumulation demonstration. Mr. Karl Springer was Project Manager and was involved in the technical and fiscal negotiation of the initial project and in subsequent major project decisions.

The Project Officer during the negotiating and planning of this project was Mr. Robert Wagner of the Technology Evaluation Staff, Environmental Protection Agency. The Project Officer throughout the remainder of the project was Mr. Andrew Kaupert. Another individual at EPA who provided input and was directly associated with several aspects of the project was Dr. Karl Hellman.

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SUMMARY

A 1975 model Chevrolet 350 heavy-duty gasoline engine was optimized to meet project emissions and fuel consumption goals of 6.7 grams per kilowatt-hour (g/kW-hr) hydrocarbon (HC) plus oxides of nitrogen (NO_x), 33.5 g/kW-hr carbon monoxide (CO), and a ten percent reduction in cycle composite specific fuel consumption (SFC). Following system optimization, 1500 hours of service accumulation were conducted with the engine in the optimized configuration. The primary procedures utilized in this project were equivalent to those given in the Proposed Rules for 1979 model heavy-duty gasoline engines. The emissions test involved a 2000 rpm nine-mode cycle with modes consisting of idle, cut-throttle, and 10, 25, 55, and 90 percent of determined maximum power. The emissions measurement instruments included: non-dispersive infrared (NDIR) for measuring CO and carbon dioxide (CO_2), chemiluminescence (CL) for measuring NO_x and a heated flame ionization detector (FID) for measuring HC.

Three basic fuel systems were evaluated; standard carburetor, Bendix electronic fuel injection (EFI) and the Dresserator inductor (DI). The standard carburetor was evaluated without modification other than normal tune-up adjustment. The EFI had a potentiometer mounted on the electronic control unit which enabled changing the air-fuel ratio by changing the setting on the potentiometer. With the DI, large changes in air/fuel ratio could be made by changing the relative location of grooved fuel control rods and smaller changes by adjusting the air bleed valves.

The primary emissions control components and systems evaluated were; exhaust thermal reactors, exhaust port liners, air injection and exhaust gas recirculation. Primary parameters evaluated were; fuel/air ratio, ignition timing and partial opening of the throttle during the cut-throttle mode. Potential capability of meeting the project's emissions goals was demonstrated with all three of the fuel systems evaluated. However, the fuel consumption goal was attained in this project only with the EFI system.

The primary problem modes in the emissions test cycle were the 90 percent power mode relative to CO and NO_x and the closed throttle (CT) mode relative to HC. With the leanest air/fuel ratio at which 90 percent of baseline maximum power could be attained, the NO_x emissions were at a very high value. Therefore, lean optimization was found to be inapplicable for reducing NO_x in the 90 percent mode (without significant derating of the engine power output). Also, use of EGR, in amounts enabling sufficient reduction of NO_x

in the 90 percent mode, would require derating the engine. Therefore, remaining within the scope of this project (no reduction or 3-way catalyst being used), rich fuel/air ratios with relatively small amounts of EGR were utilized for reducing NO_x in the 90 percent mode.

To control HC during the CT mode, shutoff of the fuel injection was used with the EFI, whereas partial opening of the throttle was used with the carburetor and the DI. Partial opening of the throttle during the CT mode, for reduction of HC emissions, generally increased the proposed cycle composite SFC by over six percent relative to shutting off the fuel. Fuel shutoff at CT was a significant factor in being able to attain a ten percent reduction in composite SFC with the EFI. With the fuel shutoff at CT, using the EFI system, fairly significant HC levels were measured (i.e., levels which would increase composite $HC+NO_x$ by 10 to 15 percent over the calculated value obtained with the optimized system). Since the fuel flow was zero, however, the calculated contribution to the emissions test composite value was zero. Even if the actual measured HC emissions during CT were included (nominally equivalent to approximately 0.7 g/kW-hr), the $HC+NO_x$ values for the optimized system remained significantly below the project goal.

The project emissions and SFC goals and the emissions test results obtained with the baseline engine, the optimized system, and in the service accumulation were as follows:

	Emissions, Grams/kW-hr				kg/kW-hr
	HC	CO	NO_x	$HC+NO_x$	SFC
Baseline Engine	5.7	34	12.1	17.8	0.450
Project Goals	---	33.5	---	6.7	<0.405[a]
Optimized System	0.4	12.2	4.5	4.8	0.392
Service Accumulation[b]	---	14.8	---	3.9	0.398

[a] Based on a ten percent reduction from the baseline value
[b] Based on 125 hours plus the Deterioration Factor

The optimized system consisted of: electronic fuel injection, thermal reactors with air injection, exhaust gas recirculation, and a high energy ignition system with vacuum advance.

This optimized system completed 1500 hours of service accumulation without any maintenance being required with the electronic fuel injection system or the thermal reactors. Some component repair and replacement were necessary in the air injection and EGR systems. An oxidation catalyst was included as an add-on during the last 750 hours of service accumulation. No substantial reduction in catalyst conversion efficiency was noted during the 750 hours of operation. In subsequent on-the-road evaluations, with this engine installed in a heavy-duty truck, generally satisfactory driveability and performance were demonstrated.

I. INTRODUCTION

This is another in a series of reports concerning emissions from engines used to power trucks and buses above 2122 kg (6000-lb) gross vehicle weight. These reports[1-13][a] cover work begun at Southwest Research Institute in 1967 on behalf of the Environmental Protection Agency (formerly the National Air Pollution Control Administration of HEW). This report describes evaluations aimed toward reducing both fuel consumption and emissions from a heavy duty gasoline engine without detrimental effect on durability of the engine.

A. Project Objective

The objective of this project phase was to evaluate emission control technology approaches that will enable heavy duty gasoline engines to meet relatively stringent emissions standards while simultaneously achieving fuel economy improvement. Goals for this phase of the project were: a ten percent or better improvement in specific fuel consumption (SFC), emissions limits of 6.7 g/kW-hr (5 g/bhp-hr) $HC+NO_x$, and 33.5 g/kW-hr (25 g/bhp-hr) CO, and durability equivalent or superior to current engines. The primary test procedure used in this project was the draft "Recommended Heavy Duty Gasoline Instrumentation and Test Procedures"[14] which was subsequently incorporated into the proposed rules for 1979 model year heavy duty engines.[15]

B. Engine and System Selection

The engine selected was to be typical of engines currently used in trucks above 8846 kg (19,501 lb) gross vehicle weight. The Chevrolet 350 CID heavy-duty engine, in addition to currently meeting the preceding criteria, had a significant number of fuel and emission control systems readily available. Based to a large extent on the availability of oxidation catalysts for heavy-duty applications and the questions involving sulfate emissions at the time this project was initiated, catalysts were not included in the optimization evaluations.

Three fuel systems were evaluated in this project. These systems included: standard carburetors, a Dresserator inductor (DI) and Bendix

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[a]Superscript numbers in parentheses refer to the List of References at the end of this report.

electronic fuel injection (EFI). The primary emission control hardware and methods evaluated were manual EGR, backpressure EGR valves (the rate of recirculated exhaust gases was modulated by the exhaust backpressure), cylinder heads with exhaust port liners, exhaust thermal reactors and air injection. Generally air injection was used in conjunction with some other control system. Parameters evaluated included: air/fuel ratio, ignition timing, and the effects of air injection rate and partial throttle opening at cut-throttle. The model and serial numbers of the engines and systems are given in Table A-1 in Appendix A.

C. Input From Phase I

Phase I of this project, reported separately[16], was to provide the modal operating conditions which could provide definition of an SFC representative of fuel consumption in vehicle operation. The Phase I study, however, showed that there was no simple correlation between the nine-mode BSFC and vehicle fuel economy, since variables such as vehicle weight and power-to-weight ratio must be considered. The correlation could not be significantly improved by change of modal weighting factors or by addition of a few steady state modes. Therefore, Phase I did not directly provide input into Phase II and a recommended procedure[14] composite SFC was selected as the primary optimization criteria for Phase II.

D. Project Reviews

A number of meetings, discussions, and reviews were held during the course of this project with the Project Officer and the other individuals at EPA involved in this project. The initial project planning meetings were held at SwRI on August 4 and October 15, 1975. Those in attendance at the August 4 meeting included: Mr. Robert Wagner, Dr. Karl Hellman, and Ms. Marcia Williams from the EPA and Mr. Charles Urban, Mr. Melvin Ingalls, and Mr. Karl Springer from SwRI. Attendance at the October 15 meeting included Messrs. Wagner, Urban, Ingalls and Springer, and Mr. Andrew Kaupert, the new EPA project officer for this project. Other primary meetings involving this phase of the project were held at the EPA facility in Ann Arbor on January 6, July 29 and September 10, 1976. Dr. Karl Hellman from the EPA and Mr. Charles Urban from SwRI were in attendance at each of these meetings at the EPA. Mr. Ralph Stahman from EPA attended the January 6 meeting; Mr. Andrew Kaupert from the EPA attended the July 29 and September 10 meetings; and Mr. Karl Springer from SwRI attended the July 29 meeting. Others in attendance during portions of the meetings, in which this phase of the project was discussed, include: Mr. Merrill Korth and Ms. Marcia Williams from the EPA and Mr. Melvin Ingalls from SwRI.

Meetings were also held with representatives from the Electronic Fuel Injection Division of Bendix and the Environmental Technology Division of Dresser Industries.

II. EQUIPMENT, INSTRUMENTS, PREPARATIONS AND PROCEDURES

This section describes the engines, facilities, instrumentation, procedures and fuels utilized in this project.

A. Engines

Two Chevrolet 350 V8 heavy-duty gasoline engines of the same model were utilized in this project. These engines were 1975 models used in Series 50-60 trucks and Series 60 buses except in California. The engines were equipped with two-barrel carburetors and the displacement and bore and stroke are as follows:

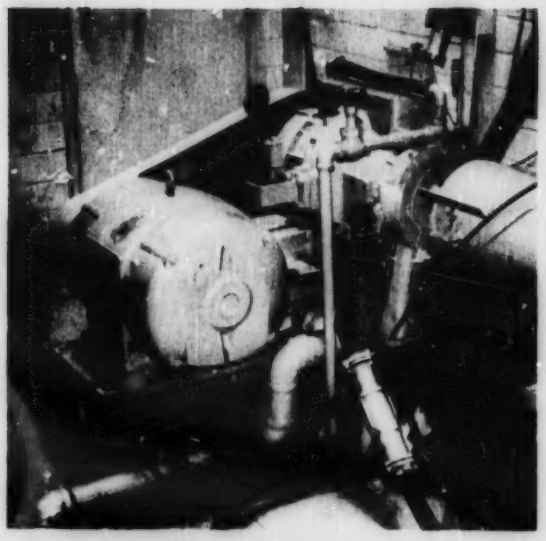
Displacement	5737 cc	350 cu. in.
Bore & Stroke	102 x 88 mm	4.0 x 3.48 in.

It was stated in the manufacturer's literature for the 1975 model year that the gasoline engines are modified to operate efficiently on 91 octane (or higher) no-lead, low-lead, or regular gasoline.

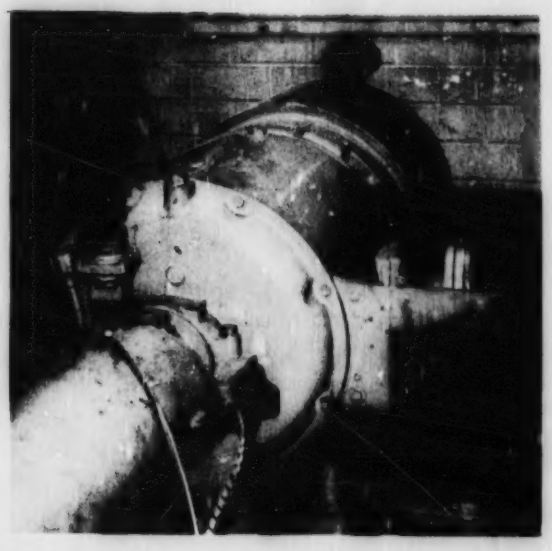
After baseline testing was initiated, it was found that although the basic engine was a 1975 model, some of the components procured were not. The primary problem involved the carburetors. The problem and the resolution are discussed in detail in Section III. B. 2. which reports the results of the baseline evaluations.

B. Dynamometers

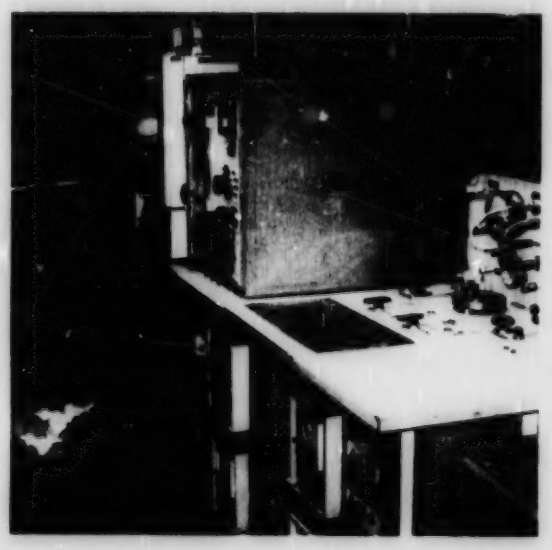
Two all-electric absorbing-motoring stationary engine dynamometers, with constant speed capability, were used in the baseline and optimization evaluations. The dynamometer used in the majority of the optimization evaluations was an Eaton Dynamatic with 373 kW (500 hp) absorbing and 149 kW (200 hp) motoring capability. The other dynamometer used for baseline and some optimization evaluations, was a Midwest Eddy current absorber with 130 kW (175 hp) capacity to which a 37 kW (50 hp) electric motor was gear belt connected. This second unit enabled constant speed and motoring capability at 1200, 2000 and 2300 rpm, the engine speeds of major interest; based on the nine- and 23-mode procedures used in this project. These dynamometer installations are shown in Figure 1.



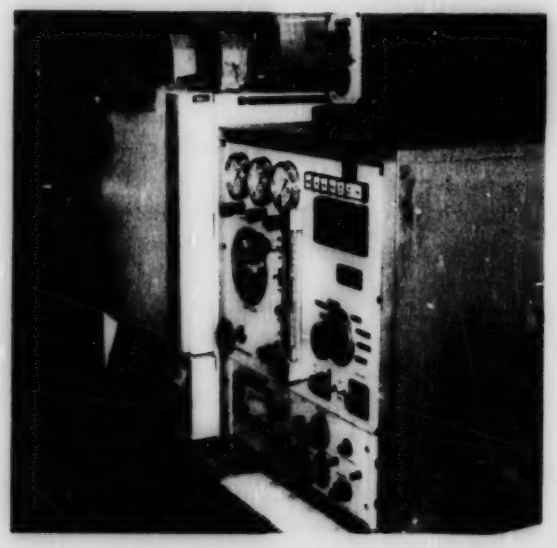
Midwest Eddy Current Dynamometer



Eaton Dynamatic Dynamometer



Emissions Instrumentation



Heated Flame Ionization Detector

Figure 1. Dynamometers and instrumentation used in the optimization evaluations.

C. Exhaust Sampling and Analysis

The exhaust sampling and analysis system, partial views of which are shown in Figure 1, was based on the draft "Recommended Heavy Duty Gasoline Instrumentation and Test Procedures" dated July 11, 1975.[14] This recommended procedure, with several modifications, was subsequently published as proposed rules in the Federal Register[15] for application in 1979 and later model years. This procedure requires the use of a heated flame ionization detector (FID) for measuring hydrocarbons (HC) and a chemiluminescence analyzer (CL) for measuring oxides of nitrogen (NO_x). Nondispersive infrared (NDIR) instruments are used for measuring carbon dioxide (CO_2) and carbon monoxide (CO). A schematic of the system, as specified in the recommended procedure, is shown in Figure 2.

One significant and several minor modifications to the recommended procedure were made to the system as used in this project. The most significant modification was that engine intake air flow was not measured. Other modifications are illustrated as follows: (1) A single sample pump large enough to handle the entire sample could not be obtained in time, so two sample pumps were utilized. (2) The sample residence time of 5 seconds specified in the recommended procedure could not be attained. The originally allowed residence time was subsequently changed to 15 seconds total response time in the proposed rules.[15] (3) A few of the atmospheric and engine operating parameters were recorded manually rather than on a recorder. (4) Hydrocarbon hang-up requirements could not be met when the use of very low ranges were required.

Although it was mutually agreed by both the EPA Project Officer and SwRI Project Leader to utilize the recommended procedure in the project, this project was specifically not intended to validate or demonstrate the new procedure nor to perform procedural development. Therefore, the procedure was followed as closely as deemed practical; with discretion being applied in areas such as measurement of air flow and the several other areas of more minor significance. The intent was to perform the research and laboratory effort using the most recent EPA thinking regarding emissions testing of gasoline engines for use in HD vehicles.

D. Emissions Test Procedures

Three emissions test procedures were utilized in this project. These procedures included: the current nine-mode certification procedure[17] (FTP), the recommended nine-mode procedure[14] (EPA), and a 23-mode procedure dure[18](which has many of the characteristics of the 13-mode diesel certification procedure). The nine-mode procedures are briefly described in Table 1.

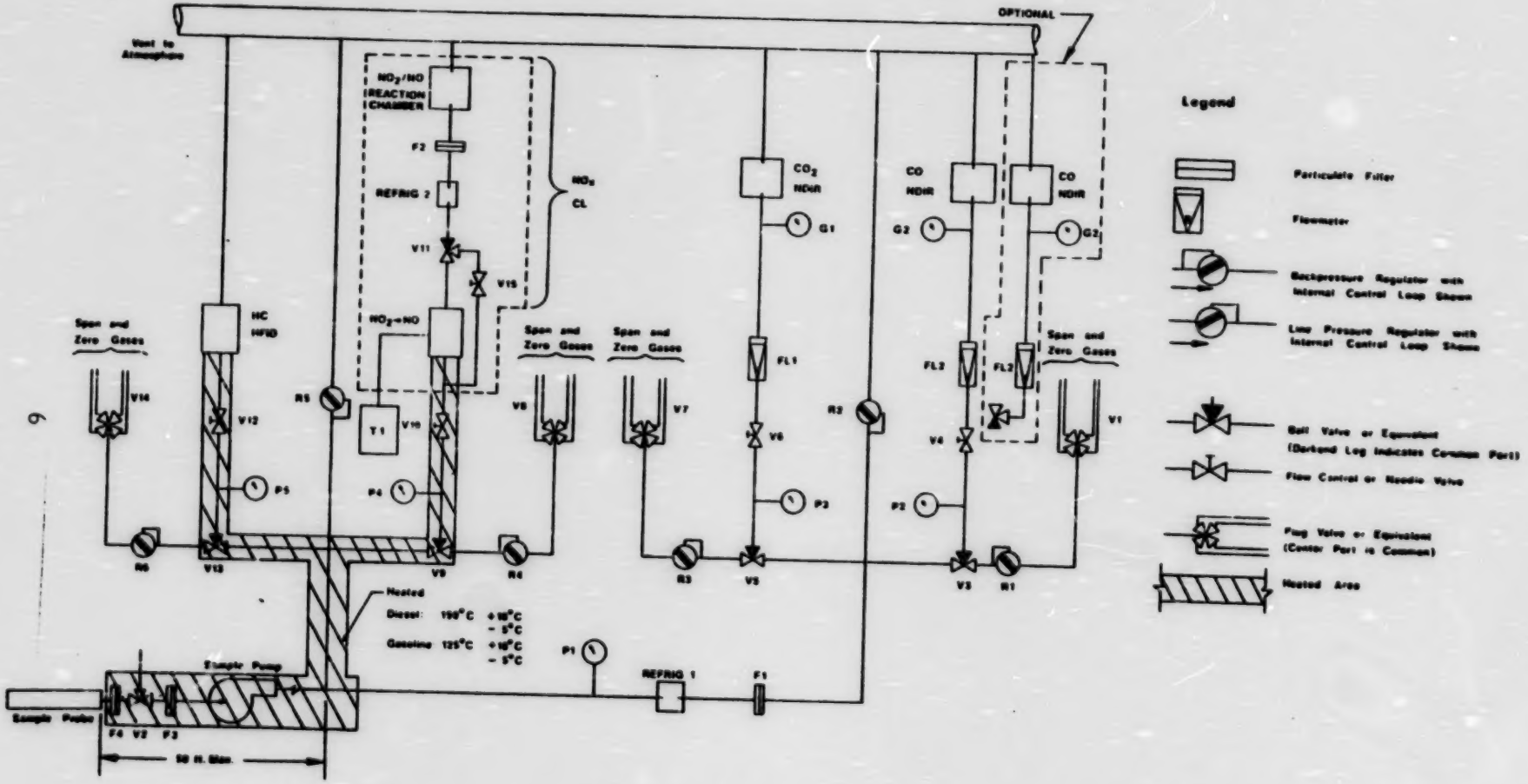


Figure 2. Heavy duty exhaust gas sampling and analytical train.

TABLE 1. DESCRIPTION OF EMISSIONS PROCEDURES

Sequence No.	Mode	Man. Vac. FTP[a]	Percent of Max. Torque EPA[b]	Time in Mode, Seconds FTP	Time in Mode, Seconds EPA	Weighting Factors, FTP & EPA
1	Idle	-	-	70	60	0.232
2	Cruise	16" Hg	25%	23	60	0.077
3	PTA	10" Hg	55%	44	60	0.147
4	Cruise	16" Hg	25%	23	60	0.077
5	PTD	19" Hg	10%	17	60	0.057
6	Cruise	16" Hg	25%	23	60	0.077
7	FL	3" Hg	90%	34	60	0.113
8	Cruise	16" Hg	25%	23	60	0.077
9	CT	-	-	43	60	0.143
	Total time per Cycle, minutes			5	9	
	Total time per Test, minutes			20	18	

[a]Current Certification Procedure(17)
[b]Recommended Procedure(14)

The primary differences between the nine-mode EPA and the nine-mode FTP procedures are: modes in the EPA are specified as various "percents of maximum torque", all modes in the EPA procedure are of one-minute duration, and the EPA procedure has only two cycles of nine modes per test, whereas the FTP has four cycles.

The experimental 23-mode procedure is listed in Table 2. This procedure had been used extensively in two previous emissions control technology projects.[6,10] This 23-mode procedure is quite similar to a 1500-2500 rpm schedule studied in a project earlier than 1972, which was reported in Reference 5. Each mode is of three minutes duration; the first minute for changing speed and load, the second minute for stabilization, and the third minute for measuring emission concentrations. The last nine minutes of the twelve minutes allocated to mode 12 are for purging the sampling system, changing sample filter media, draining sample condensate, and zeroing and spanning the instruments.

E. Calculation Procedures and Output Format

Test results were calculated and reduced to required units in accord with the applicable test methods. Primary exceptions to the preceding were:
(1) Use of metric units in reporting the results (as specified in the contract).
(2) In the nine-mode EPA procedure, the measured fuel/air ratio was not calculated since air flow measurements were deleted from this project.
(3) In the 23-mode procedure, the NOx has been corrected for humidity using the same formula as used in the federal certification test procedure:

$$k = 0.634 + 0.00654H - 0.0000222H^2$$

The output formats on the computer printouts of the test data are defined in Tables A-3, A-4 and A-5 in Appendix A.

F. Fuels and Lubricants

Three unleaded gasolines were used throughout the project. The physical and chemical properties of these fuels are described in Table 3. An unleaded gasoline meeting the requirements in the Proposed Rules was used for the baseline evaluations and for the emissions testing during the service accumulation demonstration. This gasoline was specially blended by the Howell Refinery and was designated as SwRI code EM-268.

Commercially available Gulf Crest unleaded gasoline was used throughout the engine mapping, optimization evaluations, and service accumulation demonstration. An initially available quantity of the Gulf Crest unleaded gasoline (SwRI code EM-237) was used throughout the engine mapping and optimization evaluations. A reordered quantity of Gulf Crest

TABLE 2. EXPERIMENTAL 23 MODE EMISSIONS TEST SCHEDULE
(Heavy Duty Gasoline Engines)

Mode	Engine Speed, rpm	Power Out, %[a]	Time in Minutes Mode	Time in Minutes Cumulative	Weighting Factor
1	Idle	0	3	3	0.07
2	1200	2	3	6	0.06
3	1200	8	3	9	0.06
4	1200	18	3	12	0.05
5	1200	25	3	15	0.03
6	1200	50	3	18	0.06
7	1200	75	3	21	0.00
8	1200	82	3	24	0.04
9	1200	92	3	27	0.00
10	1200	100	3	30	0.00
11	Idle	0	3	33	0.07
12	1200	0 (CT)[b]	12	45	0.12
13	2300	100	3	48	0.025
14	2300	92	3	51	0.055
15	2300	82	3	54	0.035
16	2300	75	3	57	0.06
17	2300	50	3	60	0.06
18	2300	25	3	63	0.00
19	2300	18	3	66	0.065
20	2300	8	3	69	0.00
21	2300	2	3	72	0.00
22	Idle	0	3	75	0.08
23	2300	0 (CT)[b]	3	78	0.06

[a] Observed at the flywheel, percent of maximum at the given engine rpm.
[b] Power out is zero. Engine requires motoring in this mode.

TABLE 3. FUEL INSPECTION DATA

Property		Commercially Available Gulf Crest Unleaded Gasoline: Optimization EM-237	Commercially Available Gulf Crest Unleaded Gasoline: Service Accumulation EM-268	Gasoline Blended by Howell Refinery: Emissions Testing EM-259
Distillation Range, °C (°F)	IBP	32 (89)	28 (83)	31 (88)
	10 Pct	52 (125)	18 (112)	56 (132)
	50 Pct	103 (217)	102 (215)	104 (219)
	90 Pct	170 (338)	162 (324)	159 (319)
	EP	211 (412)	217 (423)	202 (396)
	Pct Recovered	97.9	98.0	98.0
	Pct Residue	1.3	1.0	1.0
R.V.P., kPa (pounds)		62.7 (9.10)	68.7 (9.96)	60.7 (8.8)
Gravity, g/ml (°API)		0.739 (59.9)	0.734 (61.3)	0.750 (57.0)
Lead, mg/litre (g/gallon)		<1.3 (< 0.005)	3.4 (0.013)	6.1 (0.023)
Sulfur, weight percent		0.03	0.03	0.01
Hydrocarbon Composition, percent				
	Aromatics	26.4	24.1	32.5
	Olefins	2.9	3.6	4.4
	Saturates	70.7	72.4	63.1
Phosphorus, mg/litre (g/gallon)		<0.3 (<0.001)	<0.3 (<0.001)	<0.3 (<0.001)
Octane Number	Research	91.4	91.3	96.1
	Motor	84.5	85.3	86.6

unleaded gasoline (SwRI code EM-268) was used throughout the service accumulation demonstration. Thiophene was added to the initial quantity (EM-237) to increase the sulfur content to the requested level of 0.03 weight percent. The second quantity (EM-268), as received, contained 0.03 weight percent of sulfur. The gasoline used during the optimization evaluations, in addition to being representative of commercially available gasolines, met most of the requirements for use in exhaust emissions testing. The two exceptions were a slightly higher temperature at the 90 percent distillation point and a lower octane number.

The lubricant used throughout the project was Texaco Havoline SAE 30 which was designated for API service SD, SE, and CC. This lubricant met the engine manufacturer's viscosity and service specifications.

III. DISCUSSION OF THE OPTIMIZATION EVALUATIONS

This section describes the engine optimization evaluation phase of this project task. Each of the three different fuel control systems evaluated are discussed separately.

A. General Information

The two engines utilized in this project were ordered through the parts department of an authorized Chevrolet truck dealership located in San Antonio, Texas. Chevrolet heavy duty engines (along with many or most other makes of heavy duty gasoline engines) for the replacement market, do not normally come factory equipped with all accessories necessary to operate the engine (i.e., carburetors, etc.). Before ordering the two engines for use in this project, the basic engine number was cross-checked through a representative of the Chevrolet Engineering Engine Group. Upon receipt, all components were cross-checked among the three local Chevrolet truck dealers. This cross-checking method had been used successfully in several previous projects.

1. Outline of the Optimization Evaluation

After mounting the engines on the stationary dynamometer test stands, baseline evaluations, involving nine-mode certification[17] (FTP), recommended nine-mode [14] (EPA), and 23-mode[18] procedures, were conducted. Several views of the baseline engine installed on the stationary dynamometer are shown in Figure 3. Following the baseline evaluations, the major fuel and emission control systems were evaluated.

Multi-parameter evaluations, involving each and every fuel and emission control system, were beyond the scope of this project. In agreement with the Project Officer, the combinations shown in Table 4 were to be evaluated. Additional combinations, primarily those showing promise of meeting the contract goals, were to be selected based on engineering judgment and the results of the preceding evaluations. The decision was made by the Project Officer to include an oxidation catalyst only as an add-on during the service accumulation evaluation. Several of the installed fuel and emissions control systems are shown in Figure 4.

In order to describe the engine configuration on the computer printouts and on summary tables, a system of abbreviations was used. These

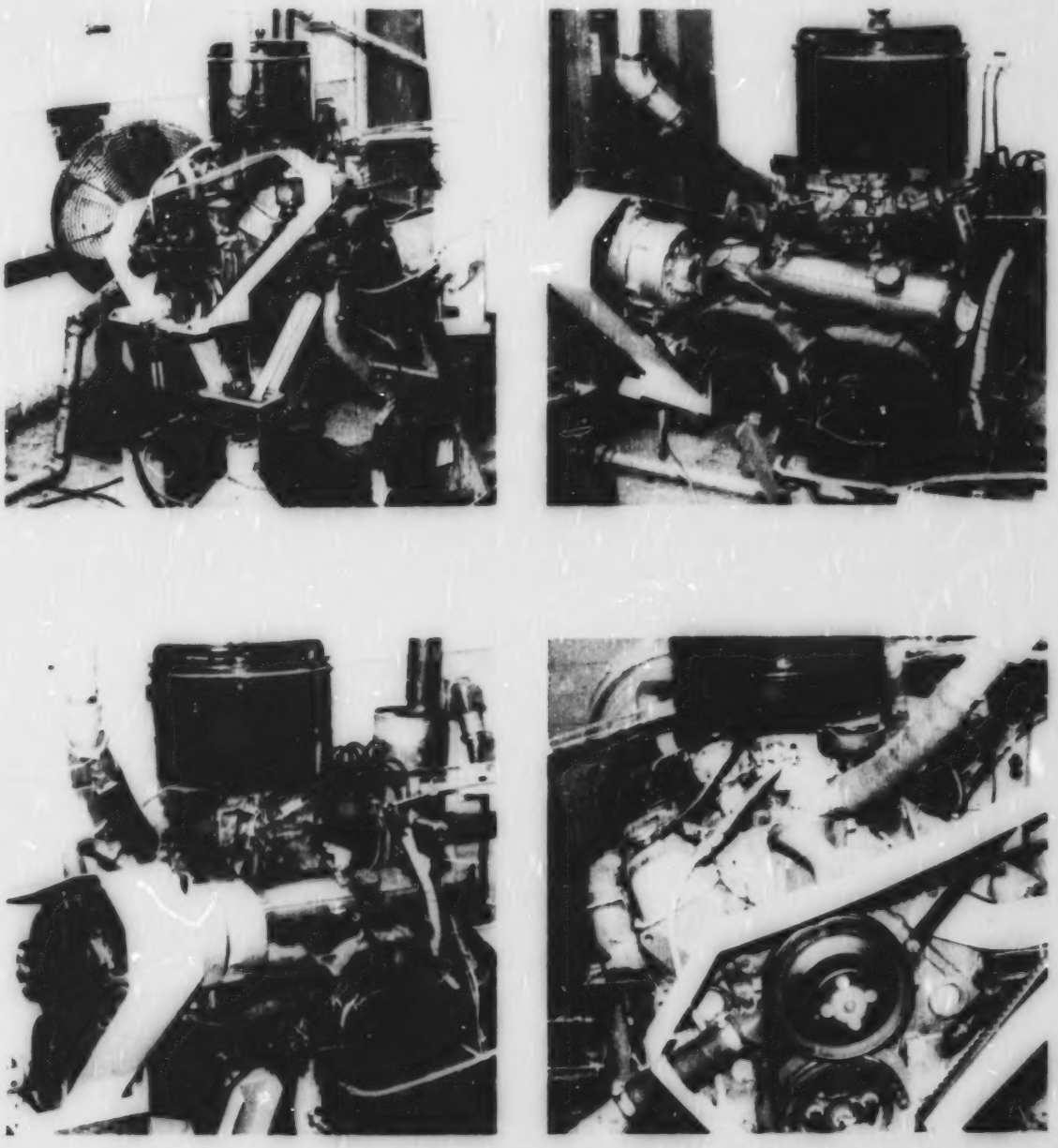


Figure 3. Baseline Chevrolet 350 CID heavy-duty engine installed on the dynamometer test stand.

TABLE 4. FUEL AND EMISSIONS CONTROL SYSTEMS EVALUATED

Emission Control System	Standard Carburetor[a]	Dresserator Inductor	Bendix EFI
Manual EGR	X	X	X
Backpressure EGR[b]	X	X	X
Thermal Reactors (TR)	X	X	X
Port Liners (PL)	X	X	X
TR+Air	X	X	X
PL+Air	X	X	X

[a] The standard carburetors were to be run without modification.
[b] A range of orifice-spring combinations were to be evaluated with at least one fuel system.

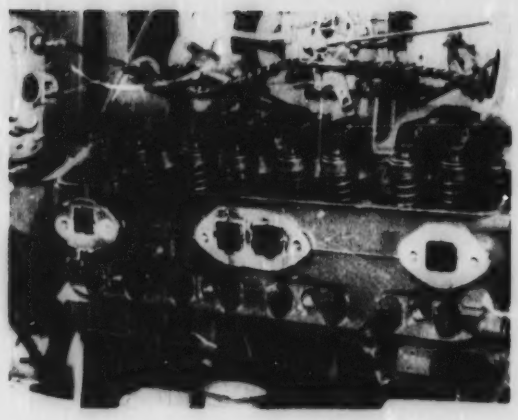
abbreviations are defined in Table A-2 in Appendix A. Also, to facilitate the use of this report, the letter designations in the appendices correspond with the headings in this section of the report up through Section F (i.e., Baseline results are reported in Section B and Appendix B, etc.).

2. Discussion of Wide Open Throttle Operation

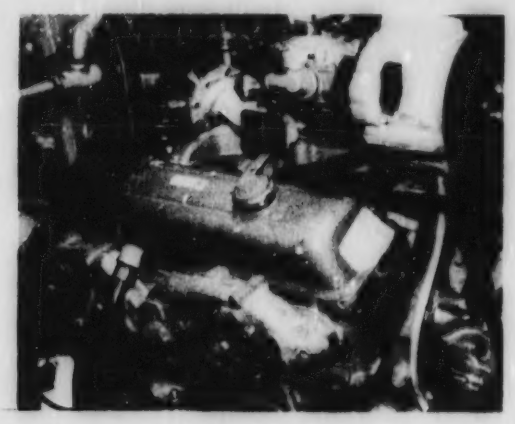
Following the decision to utilize the recommended emissions test cycle without any additional modes, it was concluded that derated maximum power should not be used in establishing the percents of maximum torque for the optimization evaluations. (Since the procedure does not require a WOT mode in the calculation of composite emissions, it appeared reasonable to conclude that the design criteria for WOT would continue to be the maximum power attainable.) The method selected was to use the baseline torque in setting up the percents of maximum torque for the emissions evaluations during the optimization evaluations. To account for changes in atmospheric conditions, the baseline torque was adjusted using the equations in the Recommended Procedure:

$$BCF = 29.38/BARO$$
$$TCF = [(T+459.69)/(85+459.69)]^{0.5}$$
$$CBT = \text{Baseline Torque} * (BCF * TCF)$$
$$\text{Adjusted Torque} = CBT/(BCF * TCF)$$

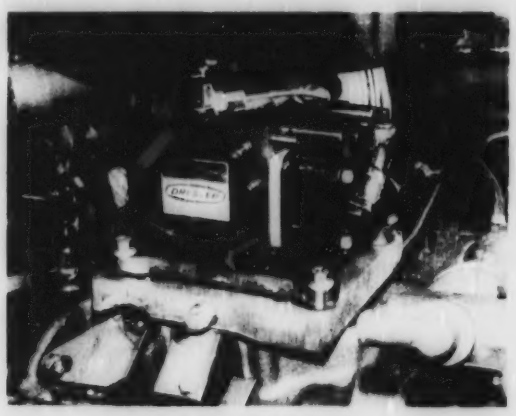
A discussion of the WOT operating conditions seems in order at this point. Figure 5 is enclosed to show the effects of air-fuel ratio on torque output and CO, and the relative effects on NO_x, at the 2000 rpm operating speed of the emissions test procedure. The figure represents a



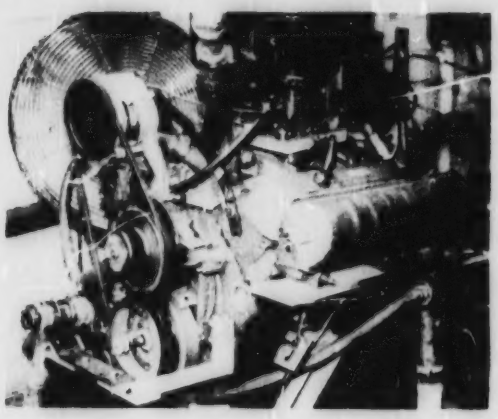
Exhaust Port Liners



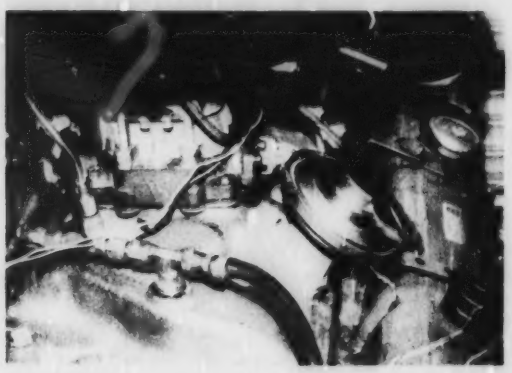
Air Pump and Air Injection Manifold



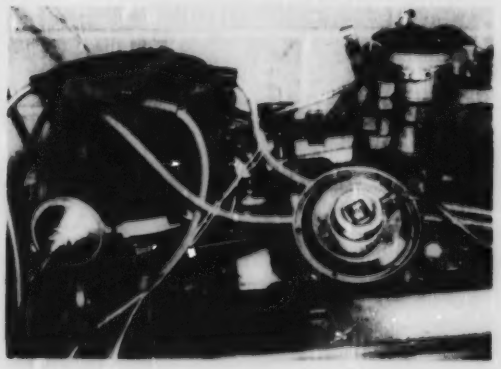
Dresserator Inductor



Exhaust Thermal Reactor



BPEGR Mounted on Intake Manifold



BPEGR and HEI Distributor

Figure 4. Fuel and emission controls used in the optimization evaluations.

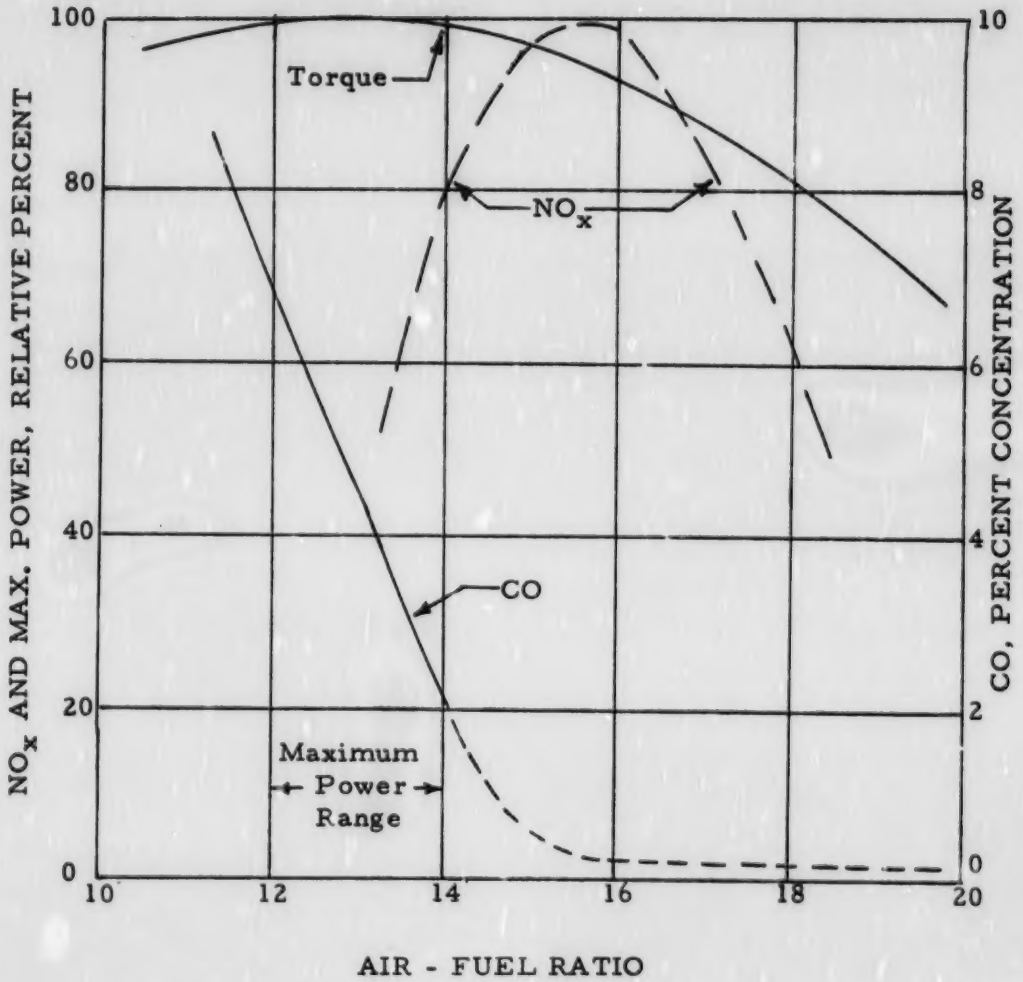


Figure 5. Relative emissions and torque vs air-fuel ratio at 2000 rpm.

composite of several sources including: SAE paper 740104, EPA publications "Factors Affecting Fuel Economy", SAE publication 76-3 "Emissions, Fuel Economy, and Durability of Lean Burn Systems", and an article in the December 1974 issue of Car and Driver about the Dresserator. It should be pointed out that agreement as to the effect on NO_x was not good and that the single line for NO_x drawn on the figure tends to represent the maximum reduction that had been reported. Not shown on the figure is that maximum efficiency occurs at about the same air to fuel ratio as for maximum NO_x.

Figure 5 illustrates the following: First, the maximum power effectively occurs in an air to fuel ratio range which produces CO between 2 and 7 percent. This generally coincides with the CO values which have been measured at WOT on a significant number of heavy duty engines at this laboratory.[10] Second, use of lean mixture or EGR to reduce NO_x at WOT would result in a reduction of maximum torque (i.e., a derating of the engine). Third, that lean mixtures (i.e., high air to fuel ratio) producing 90 percent of maximum torque produce near maximum NO_x.

3. Discussion of the Chemiluminescence Instrument

A problem was encountered with the CL system used for measuring NO_x. The NO_2 to NO converter in the CL system significantly affected the oxides of nitrogen measured value when the CO exceeded one percent. Therefore, for modes in which the CO exceeded one percent, the NO measurements were made with the sample bypassing the converter. As determined in several checks during this project, along with a number of previous determinations, NO_2 is generally not present in very significant quantities in gasoline engine exhaust. In most cases (except where the converter has an unknown effect on the values), no really significant differences in the values has been distinguished when the converter is or is not bypassed. In fact, in some instances involving diesel engines, the values have been slightly higher when the converter was bypassed.[13]

A number of determinations were made to assure that this was an apparent technological problem and not just a simple instrument operating or maintenance problem. First at 2000 rpm the engine power output was slowly increased by increasing the throttle opening. The CO, NO and NO_x emission measurements at various manifold vacuum settings at 2000 rpm were as shown at the top of the next page. The rapid increase in CO between manifold vacuums of 58 and 51 mm Hg was apparently associated with the opening of the power valve in the carburetor. As can be seen from the data, erroneous NO_x readings began to occur between CO values of 0.8 and 1.2 percent.

Manifold Vacuum, Hg		Nominal Emissions Measurements		
mm	inches	CO, percent	NO, ppm	NO_x, ppm
127	5.0	0.8	2500	2500
84	3.3	0.8	2500	2500
64	2.5	1.2	2500	1500
61	2.4	1.6	2400	700
58	2.3	1.9	2200	0
51	2.0	4.8	----	0

Next, at engine operating conditions producing over 2 percent CO, the converter temperature was varied from that for low NO_2 to NO conversion efficiency to a value exceeding that required for maximum converter efficiency. At a temperature producing low NO_2 to NO conversion efficiency the readings were the same whether or not the sample went through (NO_x-mode) or bypassed (NO-mode) the converter. Between this temperature and that for maximum converter efficiency, the CL reading in the NO_x-mode was progressively lower than in NO-mode. At the temperature for maximum converter efficiency, the reading in the NO_x-mode was near zero and remained near zero as the temperature was further increased.

In a final check, an ice-bath water trap was installed in the sample line prior to the converter. This had no noticeable effect on the CL readings in either the NO- or the NO_x-mode.

B. Baseline Evaluations and Systems Check

This section describes the break-in and baseline evaluations of the engines and initial check of the fuel and emissions control systems and components.

1. Engine Break-In

Upon receipt, the two engines and components were assembled and installed on the stationary dynamometer test stands. The engines were then operated for 25 hours using the break-in cycle described in Table 5. Engine operating conditions were monitored every 30 minutes for the 2800 rpm mode and twice a day for all other modes. The readings included: coolant water in and out of the engine, dynamometer load, oil pressure and temperature, exhaust backpressure and temperature, intake air restriction and temperature, and fuel flow. Oil pressure varied from a low of 124 kPa (18 psi) at idle to 290 kPa (42 psi) at the higher speed operating conditions. Oil temperature nominally reached a high of 102°C (215°F). Water into the engine was controlled at nominal temperatures of 60 to 66°C (140-150°F)

TABLE 5. ENGINE BREAK-IN CYCLE

Mode	rpm	Man. Vac., Hg mm	Man. Vac., Hg inches	Time, seconds Modal	Time, seconds Cumulative
1	600	Idle	Idle	30	30
2	2800	254	10	45	75
3	1200	CT	CT	45	120
4	3200	76	3	35	155
5	600	Idle	Idle	40	195
6	1600	406	16	90	285
7	1600	483	19	15	300

and water-out was controlled by the standard engine thermostat between 82 and 85°C (180 and 185°F). Intake air restriction ranged from nil at idle to a high of 64 mm of water (2.5 inches) at 3200 rpm. Exhaust system back-pressure ranged from nil at idle to a high of 107 mm mercury (4.2 inches) with Engine 1 and 90 mm mercury (3.5 inches) with Engine 2. Maximum exhaust temperature at the exit of the exhaust manifold in both engines approached 870°C (1600°F).

The maximum power output was determined at several speeds with the baseline engines. The results (corrected to 29.38 BARO and 85°F per the formula in the recommended procedure[14]) were as follows:

Engine rpm	Engine 1 kW	Engine 1 BHP	Engine 2 kW	Engine 2 BHP
1600	55	74	56	75
2000	70	94	71	95
2400	86	115	86	115
2800	98	132	98	132
3200	107	144	107	143
3800	116	155	116	156

2. Baseline Emissions and SFC Results

Following the 25 hour break-in, baseline evaluations involving replicate tests using the nine-mode FTP, nine-mode EPA, and 23-mode test procedures were conducted on each engine. These data are summarized in Appendix Tables B-1 and B-2 and the computer printouts are included as Tables B-3 through B-12 and B-25 through B-32 of Appendix B. Average results of these data using the initial carburetor are presented in Tables 6 and 7. The CO results by the nine-mode FTP, for the two engines as

TABLE 6. RESULTS OF THE BASELINE EVALUATIONS - ENGINE 1

Test No.	Test Type	Description	Average Results Gram/kW-hr HC	CO	NO_x	$HC+NO_x$	kg/kW-hr SFC
101	9-FTP	Baseline with Initial Carburetor	5.44	58.02	11.69	17.13	0.515
105	9-EPA	Baseline with Initial Carburetor	4.93	67.17	9.81	14.74	0.474
103	23-Mode	Baseline with Initial Carburetor	9.98	98.99	10.14	20.12	0.438
104	WOT	Baseline with Initial Carburetor	4.36	291.90	6.12	10.48	0.385
106	9-FTP	Baseline Carb. 6607	5.44	22.43	12.07	17.52	0.535
107	9-EPA	Baseline Carb. 6607	4.28	30.67	10.72	15.00	0.475
109	9-EPA	Baseline Repeat	3.50	29.07	11.15	14.66	0.480
107 & 109	9-EPA	Average of Tests 107 and 109	3.97	30.03	10.89	14.86	0.477
108	23-Mode	Baseline Carb. 6607	9.91	99.91	9.51	19.43	0.466
107 & 109	WOT	Average of Tests 107 and 109	4.31	247.64	5.23	9.54	0.368

TABLE 7. RESULTS OF THE BASELINE EVALUATIONS - ENGINE 2

Test No.	Test Type	Description	Average Results Gram/kW-hr HC	CO	NO_x	$HC+NO_x$	kg/kW-hr SFC
201	9-FTP	Baseline with Initial Carburetor	6.39	53.39	13.08	19.47	0.486
205	9-EPA	Baseline with Initial Carburetor	6.97	69.99	13.75	20.72	0.480
203	23-Mode	Baseline with Initial Carburetor	10.42	111.37	9.72	20.14	0.432
204	WOT	Baseline with Initial Carburetor	5.24	325.18	3.65	8.89	0.389
210	9-FTP	Baseline Carb. 6606	6.57	29.45	12.05	18.62	0.530
211	9-EPA	Baseline Carb. 6606	5.13	21.15	13.22	18.36	0.447
212	9-EPA	Baseline Repeat	6.32	46.14	10.99	17.32	0.453
211 & 212		Average of Tests 211 and 212	5.73	33.65	12.11	17.84	0.450
209	23-Mode	Baseline Carb. 6606	10.56	48.90	12.12	22.68	0.429
211 & 212	WOT	Average of Tests 211 and 212	4.63	235.62	5.80	10.43	0.355

received, were essentially the same. These CO results, however, did not agree with the reported certification results. Through the local dealers the problem could not be identified. An associate in the Chevrolet Engineering Engine Group identified the carburetors on our engines as 1974 models and provided the part number of the carburetor used for certification on the 1975 models (7044134). An attempt was made to obtain the 1975 model carburetors through local dealers but none of them recognized the number. After considerable investigation, it was determined that updating of the parts book is apparently a relatively long delayed process. According to the local dealers, the parts cannot be obtained until they are listed. The overall significance of this finding concerning parts availability is not known. This situation, however, did have a significant effect in this project.

Since it was concluded that a basically standard 1975 model baseline was essential, an inquiry was made toward obtaining the carburetors from the Chevrolet factory. The associate in the Engine Group agreed to provide the carburetors since this would be the most expedient method. Since the units were, at the time, apparently not obtainable through any parts distributors, this was agreed to.

Upon receipt of the 1975 model carburetors (6606 and 6607) from the Chevrolet Engineering Engine Group, the baseline evaluations were rerun. Average results of these data are presented in Tables 6 and 7. The individual test results, along with the averages and the standard deviations for each test are reported in Appendix Tables B-1 and B-2. The criteria followed was to obtain at least two good, repeatable runs in each baseline configuration. Since computer printouts of the evaluations were normally not available until a day or so later, making three runs has been found to be the more efficient method of assuring two good repeatable runs for purposes of establishing baseline or final optimization.

The results of the nine-mode FTP evaluations indicated that the two engines being used in this project were reasonably similar to each other in power, emissions and fuel consumption. The nine-mode FTP CO emissions data and the carburetor flow curves indicated that these carburetors were a little on the lean side of the 1975 certification engine. However, they were judged to be within normally accepted limits.

Some of the nine-mode EPA and 23-mode test results, however, were somewhat erratic; primarily relative to the CO values. These erratic results were generally due to the extent of carburetor enrichment at the 90 percent mode of the nine-mode EPA or the 2300 rpm 92 percent mode of the 23-mode procedure.

These baseline data generally show no significant difference in HC emissions between the original carburetors and the 1975 carburetors. The NO_x emissions, in the procedures based on percent of power (9-EPA and 23-mode), appear to vary in inverse relation to the change in CO emissions. The primary factor appears to be related to the extent of power enrichment at the higher power modes. Change in specific fuel consumption (SFC) ranged from some decrease through some increase. The maximum change in SFC occurred in the nine-mode FTP; an increase of nine percent with Engine 2, for the 1975 model relative to the original carburetor. In the nine-mode EPA, with Engine 1 there was no significant change in SFC, whereas with Engine 2 there was a decrease of six percent for the 1975 model relative to the 1974 model carburetor.

As an aid to the control system optimization, these baseline data were used to develop relationships between the emission concentration in the exhaust and the modal contribution to the composite emission values in the nine-mode EPA procedure. Due to the many variables, these relationships, shown in Table 8, are approximations. An example illustrating the usage of Table 8 is given in Appendix Table B-43.

TABLE 8. MODAL CONTRIBUTION TO NINE-MODE COMPOSITE G/KW HR

Mode	HC per ppm	CO per PCT	NO_x per ppm
Idle	0.0002	3	0.0005
25%	0.0013	26	0.0043
55%	0.0009	18	0.0030
10%	0.0001	3	0.0004
90%	0.0008	16	0.0027
CT	0.0001	2	0.0003

In general, the modes of concern were: all modes except the 10 percent for HC (CT is generally the most significant contributor of HC) and the 25, 55, and 90 percent modes for CO and NO_x (the 90 percent mode is generally the most significant contributor of CO).

3. Fuel and Emissions Control System Check

Initially it was planned to perform an operational check on each fuel and emissions control system prior to conducting the optimization evaluations. Due to availability and operational difficulties experienced with some of the systems, this approach was modified. The modified approach involved conducting the preliminary optimization evaluations immediately after a system was installed and made to function. Some

examples of difficulties encountered include:

(1) The port liner extensions on the thermal reactors required grinding and reshaping to enable installation into the exhaust ports in the engine cylinder head.

(2) On the heads with port liners, the welds on the liners required grinding to eliminate interference with the exhaust manifolds and the valves required seating to improve cylinder compression.

(3) With the EFI system a number of the electrical cables did not have mating connectors and some of the color coding was not in accordance with available schematics.

(4) One of the threaded holes, for intake manifold bolts, in one of the cylinder heads was tapped all the way through and was in line with a valve push rod. Installation with standard length bolts when using the EFI intake manifold resulted in bolt to push rod interference and subsequent breakage of the push rod.

All difficulties encountered were resolved in an appropriate manner as expeditiously as possible and the evaluation or optimization was resumed.

C. Standard Carburetor Evaluations

The standard carburetor was evaluated without modification or rescheduling of the modal air/fuel ratio. It is important to take this into account since in some instances this factor can have a significant effect on the results obtained. For example, the extent of fuel enrichment in the 90 percent power mode can have a significant effect on the nine-mode EPA composite HC and NO_x and can have a very large effect on the composite CO (in some tests over 75 percent of the total composite CO has been contributed by the 90 percent power mode).

The data for the primary evaluations with the standard carburetor are reported in Appendix C. Nomenclature used in the engine configuration descriptions are defined in Appendix A-2.

1. Thermal Reactors

The thermal reactors, loaned to SwRI by GM for use in this project, were initially installed onto Engine 1 and several nine-mode EPA tests were run. The primary results of the initial evaluations are summarized as follows:

Test	Run	Description	Gram/kW-hr HC	CO	NO_x	HC+NO_x	SFC, kg/kW-hr
107 & 109		BASELINE	4.0	30.0	10.9	14.9	0.477
		THERMAL REACTORS					
110	1 & 2	Air Inj. on All Modes	10.2	5.9	12.2	22.4	0.480
111	1	Air Inj. off at CT	2.1	6.6	11.8	13.9	0.479
	2	Decel used and AI off at CT[a]	0.2	4.9	11.5	11.7	0.506

[a] Deceleration control consisted of running the CT at a throttle setting which would result in a no load engine speed of 1700 to 1800 rpm.

As shown by the data the thermal reactors were very effective in reducing CO emissions and the BSFC was not substantially affected. The NO_x emissions increased somewhat and the overall effect of the thermal reactors in reducing HC emissions depended to a large extent on the cut-throttle mode.

When air was injected during the CT mode the HC emissions drastically increased; apparently due to quenching of the oxidation reaction which continues in the exhaust system during normal cut-throttle operation. (In the previous baseline evaluations, the CT mode contributed approximately 50 percent of the composite HC). When the CT mode was run in the manner in which current deceleration control devices operate, the composite HC emissions were reduced with the thermal reactors to the very low value of 0.2 g/kW-hr. This method, however, increased fuel consumption and utilized a device whose real life effectiveness is open to question.[10, 13]

These initial evaluations, conducted with the thermal reactors, illustrated that the thermal reactors, with air injection, very effectively reduced HC and CO in all modes except normal cut-throttle. In the evaluations with the throttle manually held open to an equivalent no load rpm of 1700 to 1800 rpm during the CT mode, the HC composite emissions in nine-mode EPA procedure evaluations were reduced to a very low value. However, this decrease in HC was associated with a significant increase in composite BSFC. Therefore, evaluations were conducted to determine whether a large reduction in HC could be obtained in the CT mode without significantly increasing BSFC.

The additional evaluations at CT involved ignition timing, fuel/air ratio and exhaust manifold air injection flow rate. The results were qualitatively evaluated directly from the charts without running the data through the computer. At normal baseline CT fuel flow rates, the HC

emissions at CT would start at a relatively low level and rapidly increase with time. It generally required about one minute for the HC to attain a reasonably stable value. Indications were that exhaust system temperature was the primary factor and that the modes preceding CT had a significant effect on the initial HC emission rate at CT. The addition of air injection during CT generally increased the HC emissions. This increase in HC emissions was apparently due to quenching of the oxidation reaction within the exhaust manifold. In evaluations involving variation of ignition timing and fuel/air ratio during the CT mode, no large reductions in HC emissions were obtained.

Partial opening of the throttle during the CT mode, however, did have a definite, definable effect on HC emissions. In the engine involved in these evaluations (Engine 1) the normal stable HC emission value at the standard baseline CT throttle setting approached 15,000 ppm both with and without the thermal reactor. The raw data results (using the thermal reactor without air injection), at full and partial cut-throttle operation were as follows:

Fuel Flow, g/hr (lb/hr)	HC, ppm[b]	$\left(\frac{\text{Fuel Flow}}{.14} * \frac{\text{HC ppm}}{10^6}\right)^a$
5443 (12)	160	6
4536 (10)	1600	52
3629 (8)	6000	156
2041 (4.5)	12000	175

[a] These values provide a rough approximation of the relative emission rate in g/hr.

[b] Nominal value - the test to test variability in these few tests was around ± 50 percent of the nominal ppm value given. Test to test variability was not statistically determined.

These data indicate that large reductions in HC emissions, obtained using partial opening of the throttle, are associated with relatively large increases in fuel flow.

2. Port Liners

The cylinder heads with stainless steel exhaust port liners were initially evaluated on Engine 2. As previously mentioned, some modifications were required before the exhaust manifolds could be installed on the cylinder heads and lapping of the valves was required. The primary results of the evaluations are summarized as follows:

Test	Run	Description	Gram/kW-hr HC	CO	NO_x	HC+NO_x	SFC, kg/kW-hr
211 & 212		BASELINE	5.7	34	12.1	17.8	0.450
213		PORT LINERS					
	1 & 2	Without Air Inj.	5.2	30	12.0	17.2	0.465
	3	Air Inj. on all Modes	11.7	16.1	10.7	22.4	0.464
	4	Air Inj. off at CT	2.8	15.6	11.3	14.1	0.460

As shown by the data, the port liners with air injection reduced CO by about 50 percent while the BSFC increased a few percent. No specific cause for the increase in BSFC was apparent. As with the thermal reactors, the composite HC value was significantly influenced by the HC emission rate during the CT mode.

The port liners appeared to be less effective than were the thermal reactors in reducing CO (under similar operating conditions the composite CO emission rate with the thermal reactors was less than half the rate with the port liners). Modal analysis of the test results also indicates that the thermal reactors reduced HC to significantly lower absolute values than were attained with the port liners. Had deceleration control been used in these evaluations with the port liners, the composite HC value (based on analysis of the modal data) would have been around 0.8 g/kW-hr; as compared with less than 0.2 g/kW-hr with the thermal reactors.

3. Backpressure and Manual EGR

Engine 1 was reassembled with the standard original cylinder heads, carburetor 6607, a light duty intake manifold with EGR ports, light duty exhaust manifolds with air injection ports, and an HEI distributor. A test was run in this modified baseline configuration (Test 115) to establish a baseline for the EGR evaluations. In Test 115, the composite HC was significantly increased over the original baseline and composite CO was over double the original baseline value. This large increase in CO was primarily due to the large increase in CO that occurred in the 90 percent mode. Maximum power was also somewhat lower than in the baseline evaluations. No specific cause could be found, but the variation between cylinder to cylinder compression pressure had become marginally acceptable. Therefore, additional optimization evaluations using this engine were minimized and, after completion of the initial control system evaluations, an exploratory overhaul was performed.

A test was run with the Backpressure EGR valve (BPEGR MX-4809 SN-1223) in the as received configuration, followed by a single

evaluation with the original orifice and each of the replacement springs provided (Tests 116, 117 and 118). The results were not very significantly different from the results in Test 115; the evaluation without the BPEGR valve. Prior to running any additional 9-mode tests, the EGR rate at various manifold vacuum settings was determined. One set of these EGR vs MV determinations was made using the largest possible orifice size (13.5 mm) that can reasonably be used in this BPEGR valve. The results of these evaluations, given in Tables C-2 and C-3 in Appendix C and summarized as follows, show that with two of the three springs, a significant EGR rate could be expected only in the 55 percent mode of the 9-EPA procedure.

Mode	Man. Vac., Hg mm	Man. Vac., Hg inches	Approx. % EGR with Spring No. 1	2	3
10%	460	18	0	0	0
25%	400	16	< 2	∿3	0
55%	190	7.5	5	6	< 2
90%	50	2	∿1	∿1	∿1
WOT	15	0.6	0	0	0

Note: Maximum practical orifice size of 13.5mm was used.

Modal evaluations with manual EGR were then conducted and these are reported as Test 119. Using these values in conjunction with the BPEGR rates determined from Tests 120 and 121, the best combination spring and orifice were selected for the BPEGR valve. With the 7 coil spring and the 13.5 mm orifice, Test 122 was run without air injection and Test 123 with air injection. In Test 123 the air injection was inadvertently left on at CT; had it been shut off the composite HC would have been between 4 and 5 g/kW-hr. The results of these tests along with the baseline results are summarized as follows:

Test	Description	Gram/kW-hr HC	CO	NO_x	$HC+NO_x$	kg/kW-hr SFC
107 & 109	Baseline	4.0	30	10.9	14.9	0.48
115	Modified Baseline	6.1	93	9.3	15.4	0.50
116, 117, 118	BPEGR as Received	7.3	92	8.0	15.3	0.49
122	BPEGR -13.5mm orifice	5.8	115	4.8	10.6	0.51
123	BPEGR with AI	[a]	43	4.6	[b]	0.53

[a] 12.4 with AI at CT & ∿ 4.5 without AI at CT
[b] 17.0 with AI at CT & ∿ 9.1 without AI at CT

Note: All of the above tests were run at the standard baseline setting of

14° BTDC at 2000 rpm. The AI was standard air injection into the exhaust manifold using the heavy duty air pump provided for this project. The high CO in the modified baseline configuration was primarily due to the 90 percent power mode.

Although the NO_x was significantly reduced using the BPEGR valve, as shown in Test 123, this was associated with an increase in SFC. Also, the HC and CO values are relatively high and considerably above the goals of this project.

4. Emissions Control System

The emission control system and parameters evaluated with the standard carburetor included: port liners with air injection, manual EGR, the HEI with manual ignition advance, and deceleration control at CT. The nine-mode EPA results are summarized as follows:

TABLE 9. SUMMARIZED RESULTS OF EMISSIONS CONTROL SYSTEM WITH STANDARD CARBURETOR

Test	Run	Description	Gram/kW-hr HC	CO	NO_x	HC+NO_x	kg/kW-hr SFC
---	--	Project Goals	-	33.5	-	6.7	-10%
107 & 109		Baseline	4.0	30	10.9	14.9	C.48
115	1	Modified Baseline	6.1	93	9.3	15.4	0.50
124	1	Mod. BL with PL&AI	-	24	8.6	-	0.50
130	1X[a]	PL-HEI-EGR-AI-IA	4.5	19	5.8	10.4	0.44
130	2X[a]	With 1400 NLRPM at CT	1.3	18	5.9	7.2	0.47
Estimated values with TR[b]			0.5	<18	5.9	6.4	0.47

IA - Ignition Advance

[a] Runs 1X and 2X were developed from results in modal evaluations.

[b] HC and CO values are based on results of other evaluations involving thermal reactors

These data indicate that the emission goals of the project are attainable using carburetion. However, utilizing a higher no-load engine speed (NLRPM) in the cut-throttle mode has been required in order to reduce the HC emissions to acceptable levels (using the emission controls included in this project). Therefore, a ten percent reduction from baseline SFC has not been achieved with the standard carburetor. These evaluations concluded the optimization evaluations of systems using the standard carburetor.

5. Exploratory Engine Overhaul

An exploratory overhaul was performed on Engine 1 in an effort to determine causes for the higher BSFC and the decrease in maximum power. Although no definite cause could be found, the appearance of the piston rings and the cylinder walls indicated that the rings had not seated properly. The overhaul included new piston rings and bearing inserts and lapping of the valves. Results of the post overhaul nine-mode EPA evaluations, after a 25 hour break-in period, are given in Appendix B and are summarized as follows:

Test	Description	Gram/kW-hr				kg/kW-hr
		HC	CO	NO_x	$HC+NO_x$	SFC
107 & 109	Original BL	4.0	30	10.9	14.9	0.48
131	Post Overhaul BL	5.1	48	10.3	15.4	0.46

In addition to the improvement in SFC, the maximum power was returned to essentially the same maximum power initially obtained with this engine and repeatedly obtained with Engine 2.

D. Dresserator Inductor

The Dresserator Inductor used in this project is illustrated in Figure 6. The primary difference is that the unit used is 2-throat, whereas the unit in the illustration is a single throat.

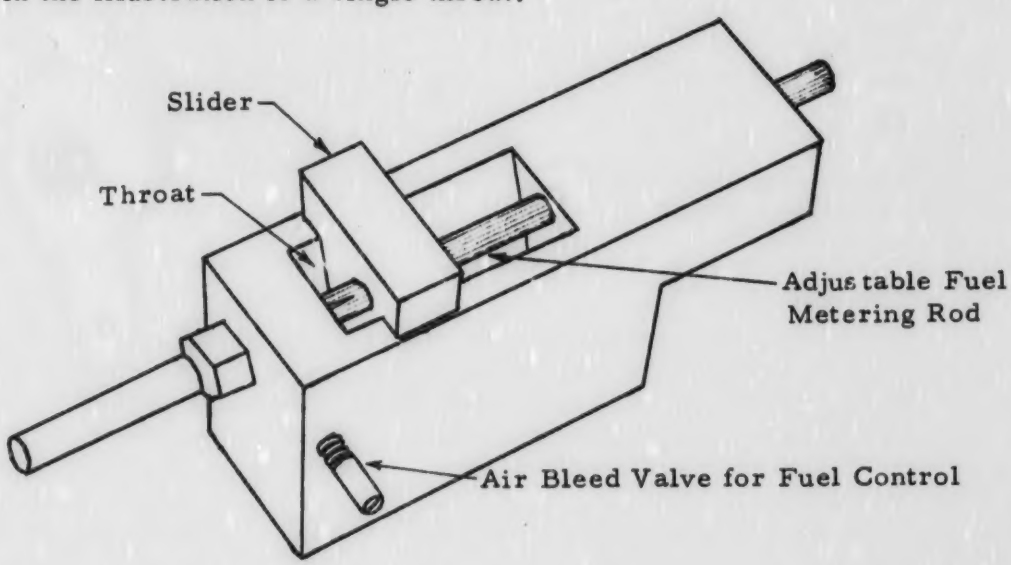


Figure 6. Illustration of the Dresserator Inductor.

The throat is reported to be a sonic nozzle which is adjustable by moving the slider. Fuel is controlled by means of shaped grooves in the fuel metering rod which is attached to the slider. Adjustment of the fuel flow can be obtained by either moving the fuel rods relative to the slider or by using the air bleed valve. Moving the fuel rod to the right, as one looks down on the illustration, increases the fuel flow. Opening the air bleed valve decreases the fuel flow by decreasing the pressure differential between the fuel bowl and the throat.

The data for the primary evaluations with the Dresserator Inductor are reported in Appendix D. Nomenclature used in the engine configuration descriptions are defined in Appendix A-2.

1. Initial System Evaluation

The initial evaluation (Test 206 Run 1) was made with the unit as received. The calculated air/fuel ratio varied from a little over 11 at idle to a little over 15 at the 90 percent power mode. In Run 2 the air bleed was adjusted to a CO concentration below 0.2 at the 55 percent mode. In this run the air/fuel ratio varied from approximately 13 to 16.5. After some preliminary modal evaluations were conducted, the 1975 model baseline carburetors were received from GM and the evaluation of the Dresserator was discontinued until the baseline evaluations had been rerun using these carburetors.

Engine 2 was assembled with the standard heads, an intake manifold with EGR ports, exhaust manifolds with air injection ports, and an HEI distributor. Test 219, Run 2, was run in this configuration with the baseline carburetor 6606. The nine-mode EPA results in g/kW-hr were 6.0 HC, 51 CO, 10.4 NO_x, 16.4 HC+NO_x, and the SFC was 0.44 kg/kW-hr. These results are similar to the repeat runs of the original baseline. In a run with the distributor vacuum advance connected (Test 219, Run 3), the SFC was reduced to 0.39 kg/kW-hr while the NO_x was increased to 14.9 g/kW-hr. The engine was judged to be operating satisfactorily, so the carburetor was removed and the Dresserator Inductor (DI) was re-installed.

Initially, a number of steady state evaluations were run without EGR (Test 220) followed by evaluations with manual EGR (Tests 221, 222, 223 and 224). The idle and CT modes were subsequently evaluated in more detail in Test 231. These evaluations indicated that the adjustment of the fuel rod was very critical; with small changes making large differences in fuel flow. Also, the idle mode required adjustment of air bleed in addition to the rods to obtain satisfactory idle setting. The reproducibility of the idle mode was poor. It should also be pointed out that the inductor provided for this project does not have fuel enrichment during acceleration and it was difficult to accelerate from idle.

Tests 225 through 227 were not fully processed since a problem was experienced with the NO_2 to NO converter used with the chemiluminescence instrument. In measuring the CO_2 in the intake for determination of percent EGR, the sample was allowed to go through the converter. After sampling from the intake the NO_x values would read low for several minutes. This situation with the CL instrument can probably be judged as being a problem only in research projects of this type. The solution applied to the problem in this project was to bypass the converter in situations where this effect was likely to occur.

2. Thermal Reactors

The exhaust manifolds with air injection ports were replaced with the thermal reactors and evaluations were conducted with and without EGR. Based on the results of the previous steady state evaluations, nine-mode EPA Tests 229, 230 and 232 were run using compromise DI settings which were reasonable to attain during such a test. The results were as follows:

			Gram/kW-hr				kg/kW-hr
Test	Run	Description	HC	CO	NO_x	HC+NO_x	SFC
219	2	Modified BL w/Carb.	6.0	51	10.4	16.4	0.44
	3	With Ign. Vac. Advance	7.8	43	14.9	22.8	0.39
		DRESSERATOR INDUCTOR & THERMAL REACTOR					
229	1 & 2	DI-TR	2.1	7	9.9	12.1	0.42
	3	With Ign. Vac. Advance (VA)	3.0	13	14.1	17.2	0.38
230	1	With AI except at CT	2.3	7	10.5	12.8	0.42
	3	With AI and 1250 NLRPM at CT	0.1	5	9.5	9.6	0.44
232	1	With VA, AI, MEGR & 1250 NLRPM	0.2	7	6.4	6.6	0.41
	2	Repeat of run 1	0.8	8	8.5	9.3	0.41

Note: Tests 229 through 232 were all with the thermal reactors installed. The 90 percent power modes used in Tests 232 Runs 1 and 2 used different rod settings which were determined separately from the actual test. The difference in the NO_x results between Runs 1 and 2 in Test 232 are primarily indicative of the difficulties involved in obtaining the same settings at the 90 percent mode with the systems used. The vacuum advance curve is given in Table A-6 in Appendix A.

The results of these evaluations indicate that, when using the Dresserator Inductor along with TR and EGR, the emissions and the SFC can be

significantly reduced. As was experienced with the carburetor, however, simultaneously meeting both the emissions and fuel consumption goals appeared unlikely (using the emission controls evaluated in this project).

3. Lean Fuel/Air Ratio

Additional evaluations were conducted on Engine 1 using the cylinder heads with port liners, the intake manifold with EGR porting, and the exhaust manifolds with air injection ports. Primary emphasis was placed on the potential use of very lean fuel/air ratios.

Evaluations involving variation of fuel/air ratio are reported as Tests 125, 126 and 127 in Appendix D-34 through D-45. These data illustrate the sensitivity of the air/fuel ratio to relatively small changes in the fuel control rod settings. In addition, the NO_x emission concentrations, in the higher load modes, were not sufficiently reduced at lean air/fuel ratios to enable meeting the emission goals while still producing low SFC. This is illustrated in the following rounded-off and summarized data from the wide-open throttle evaluation (Test 127, Run 2).

Rod Setting[a]	Emissions		Power,	Fuel,	SFC
	CO, %	NO_x, ppm	kW	kg/hr	kg/kW-hr
1.50	0.1	1300	53	18.0	0.34
1.56	0.4	1600	59	19.4	0.33
1.63	0.8	1500	62	20.4	0.33
1.69	1.2	1200	64	20.5	0.32
1.75	1.7	1100	65	20.8	0.32
1.81	5.6	700	70	23.9	0.34
1.88	6.8	400	70	25.8	0.37
1.94	7.4	300	70	26.0	0.37
2.00	7.9	200	70	26.4	0.38

[a] 1.6 mm movement of the fuel rod between each setting.

4. Backpressure EGR

The results with the BPEGR valve as determined in Test 129 are summarized on the next page. The configuration consisted of the Dresserator inductor, cylinder heads with port liners, HEI, intake manifold with EGR porting, and exhaust manifolds with air injection ports. As with the other fuel systems evaluated, the BPEGR valve also does not appear to be optimized for this engine system configuration using the DI. The relationships of the recirculated exhaust flow rate of the BPEGR valve relative to engine operating conditions, as given in the Appendix Tables C-2 and C-3 also generally apply to this system using the DI.

Test	Run	Description	Gram/kW-hr HC	CO	NO_x	HC+NO_x	kg/kW-hr SFC
107 & 109		Original Baseline	4.0	30	10.9	14.9	0.48
		DRESSERATOR INDUCTOR					
129	1	No EGR, AI or VA-14B-1.44 RODS	19.4	83	8.5	27.9	0.47
129	2	Run 1 plus BPEGR (.53 & 7 Coil)	10.0	97	6.9	16.9	0.47
129	3	Run 2 plus AI except at CT	6.4	20	6.7	13.1	0.48
129	3XA	Run 3 plus 1100 NLRPM at CT	0.7	15	6.7	7.4	0.49
129	3XB	Run 4 plus Inserted Mode 7	0.7	17	4.2	4.9	0.50

5. General Discussion of the Dresserator Inductor

The specific model of Dresserator Inductor utilized in this project had several limitations and shortcomings. Some of the more important of these were: the fuel was not properly scheduled over the full range from idle and CT to full load, the difficulty in resetting the fuel control rods, and the difficulty in repeating specific modal conditions. These shortcomings of and the results obtained with the specific unit evaluated, were significant factors in the decision not to attempt final optimization with the Dresserator inductor.

A primary benefit of the Dresserator inductor, according to the literature, is the potential capability of operating at very lean fuel/air ratios. Evaluations in this and previous projects plus data in the literature, however, have indicated that lean fuel/air ratios may not be applicable to the 90 percent power mode, so important in the HD test of gasoline engines (i.e., without significant derating of the engine). The 90 percent power mode has generally been found to be the primary contributor of CO and NO_x in the nine-mode EPA test.

E. Bendix Electronic Fuel Injection

The Electronic Fuel Injection (EFI) system used in this project was basically the same system that was optionally available in 1975 Cadillac vehicles. A good description of the system is provided in the "1975 Cadillac Shop Manual - Electronic Fuel Injection Supplement." The system is illustrated in the following sketch, from a Bendix publication.

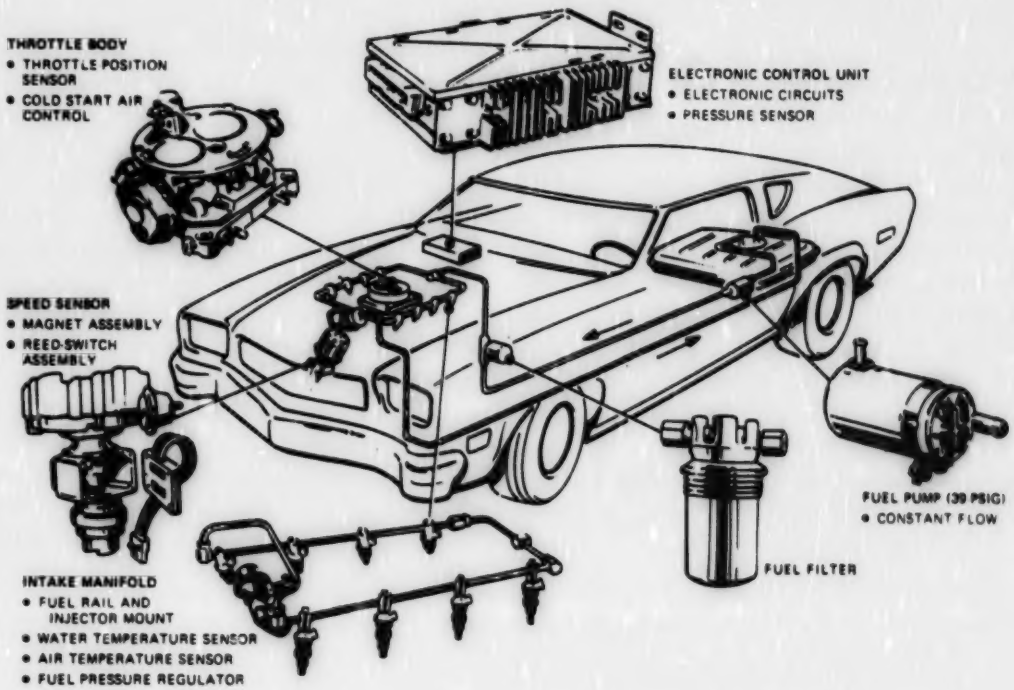


Figure 7. Illustration of the Electronic Fuel Injection System.

As described by Bendix, the EFI system is a low pressure, two group, pulsed-timed, intake manifold injection system, that meters fuel to individual cylinders by injecting it in the vicinity of the cylinder intake valve. The fuel is controlled by electrically actuated, solenoid-injection valves operating with a supply pressure differential of 268.7 kPa (39 lb/in^2). The injection phasing and duration is controlled by an electronic control unit (ECU) which computes the needed quantity of fuel from measurements of intake-manifold pressure, engine speed, and air temperature combined with a knowledge of engine physical and operating parameters, engine phasing, and engine temperatures.

The injection timing is set to fire the first group of injectors 22 crank angle degrees before induction (i.e., intake valve begins to open) of the first cylinder in that group. The only significant modification to the system used in this project was a potentiometer mounted on the ECU which enables changing the amount of fuel injected and, thereby, the fuel/air ratio.

Data for the primary evaluations with the EFI are reported in Appendix E. The nomenclature used in the engine configuration descriptions are defined in Appendix A-2.

1. Initial Evaluations with the EFI

The fuel injection system was initially installed onto Engine 2 while retaining the cylinder heads with the exhaust port liners. Extra care was taken in the assembly, since some electrical connectors did not utilize mating connectors and were not color coded in accordance with the available schematics. After assembly and initial debugging, the only malfunction of any significance was that the fuel flow would shut off at full wide-open throttle position. This problem was discussed with the Bendix factory representative and he agreed to provide whatever assistance became necessary. It was subsequently determined that the wiring to a starting circuit had been incorrectly assembled. After reassembly of the starting circuit, the fuel no longer shut off at WOT and no other malfunctions were encountered with the EFI system throughout the duration of the optimization evaluations. The other effect of the incorrectly assembled starting circuit was a change in the numerical setting on the fuel control potentiometer. It did not, however, affect the scheduling of the fuel flow relative to engine operating conditions. Tests 214 through 218 were run with the initial assembly, whereas all subsequent evaluations with the EFI system were with the starting circuit correctly assembled.

Initially, several runs were made with the fuel control potentiometer on the ECU at different settings for each run. The configuration consisted of the EFI and the exhaust port liners without air injection. Results of these Test 214 evaluations were as follows:

		ECU	Gram/kW-hr				SFC,
Test	Run	Setting	HC	CO	NO_x	HC+NO_x	kg/kW-hr
BASELINE CARBURETOR			5.7	34	12.1	17.8	0.450
214	4	150	7.7	13	9.0	16.6	0.472
	1 & 2	250	8.0	54	8.7	16.7	0.445
	3	350	6.1	89	8.5	14.6	0.453

Each mode of the nine-mode EPA procedure was then evaluated over a wide range of air to fuel ratios and these data are reported as Test 215, Runs 1 through 5. A best setting for each mode, with primary emphasis on SFC, was then used to construct a nine-mode EPA test. The results of this test, constructed of modal data, are enclosed as Test 215, Run X, and are summarized as follows:

	HC	CO	NO_x	SFC
Test Constructed from Modal Data	1.3	16	12.0	0.435

Based on a Bendix representative stating that, when using manifold fuel injection, the fuel can be shut off at cut throttle without significantly affecting

driveability, fuel shutoff at CT was used in this modally constructed, modally optimized test. As shown by the results in modally constructed Run X, relatively low HC and CO emissions resulted along with 3 to 6 percent improvement in SFC. It should be noted that most of the HC and a significant part of the SFC improvement directly resulted from shutting the fuel off at CT.

It was subsequently determined that the fuel flow at CT was reduced to a very low flow rate in an ECU unit obtained from the local Cadillac dealer. This finding, along with observation of the engine performance on the dynamometer, further verified that the fuel can be shut off at CT, when using fuel injection, without significantly affecting engine operability.

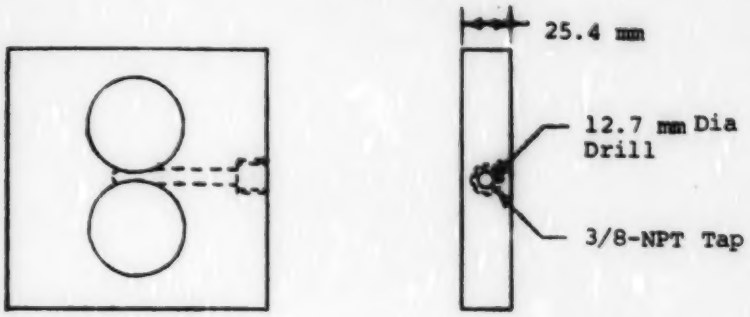
A determination, at each individual cylinder exhaust port, was made at idle and the 10, 25 and 55 percent power modes of the nine-mode EPA procedure. These tests are labeled as Test 215, Runs 11 through 14. In these checks, cylinder 1, except for idle, consistently had the highest air to fuel ratio and cylinder 2 the lowest. The cylinder 1 injector was interchanged with the cylinder 2 injector but this had no effect on the air to fuel ratios in the respective cylinders as determined by sampling the exhaust. With the exception of these two cylinders the air to fuel ratios were essentially uniform from cylinder to cylinder.

2. Exhaust Gas Recirculation and Initial System Optimization

Additional optimization evaluations were conducted with the Bendix EFI in a system configuration including the cylinder heads with port liners, manually operated EGR inputed through the spacer used to adapt the throttle body of the EFI system to the intake manifold, air injection into the exhaust port liners, and the HEI distributor. Initially, a check was made to assure reasonable distribution of the EGR to each cylinder. The check involved adjusting the EGR to a flow rate in the 55 percent of maximum power mode which reduced the NO_x by more than half relative to the baseline values. The emissions from each cylinder were then sampled through the ports for the air injection tubes. The processed results are included as Test EGR in Appendix E. The NO_x ppm values ranged from 550 to 724, with a simple average for the eight cylinders of 630 ppm.

These data, although raising similar questions to those which were applicable to the air to fuel ratio cylinder to cylinder data, indicate reasonable agreement of exhausted NO_x implying reasonable EGR mixing and cylinder distribution. Some of the questions remaining unanswered involve: the high HC values on the outside four cylinders (1, 2, 7 and 8), the significant difference in total carbon between cylinder 2 and cylinders 1 and 8, and the difference in NO_x values between cylinders 1 and 8 when other emission values and the total carbon are similar.

The EGR system used for these evaluations consisted of a 1/2 NPT pipe tapped into the exhaust system immediately after the "Y", a gate valve for control of the EGR flow rate, asbestos insulation wrapped around the pipe, and a 3/8 NPT threaded port into the throttle body spacer. A single 12.7 mm (1/2 inch) diameter hole was drilled into the 25.4 mm thick spacer used between the throttle body and intake manifold. This hole opened equally to each of the two openings into the intake manifold. The EGR porting in the spacer is illustrated as follows:



A number of multi-variable determinations involving EGR flow rate, ignition timing and air/fuel ratio were conducted. Some of the more pertinent of these evaluations were processed through the computer and are reported as Test EGR in Appendix E. The modal percent of maximum power for the modes was determined on the basis of baseline maximum using the procedure previously described. The formula is repeated as follows:

$$\text{TORQUE}^{a} = \text{CORRECTED BASELINE TORQUE} * \frac{\text{BARO}}{29.38} * \left(\frac{85 + 459.69}{T + 459.69}\right)^{0.5}$$

[a]Torque for setting up modes of the test procedure.

From the data obtained in these determinations, settings producing minimum emissions with minimum BSFC were selected and nine-mode EPA tests were run using these settings. The selection of the settings was based on engineering judgement with the aim of minimizing HC, NO_x and BSFC while keeping nine-mode EPA composite CO below 33.5 g/kW-hr. One of the factors affecting the selection was that the emission rates obtained in steady state operation were not always identical to the rates obtained in the nine-mode test. This variation between the steady state and nine-mode modal emissions was primarily evident relative to CO in the 90 percent power mode.

Tests 217 and 218 were run as essentially standard tests with all necessary adjustments to the EFI, EGR, etc., made during the first few seconds of each mode. Since the high energy ignition (HEI) distributor with

vacuum advance was found to provide the near optimum ignition timing pattern for each mode, this distributor was used. The ignition timing curve used in these evaluations is presented along with the standard 1975 Chevrolet 350 HD and the 1975 Cadillac EFI system curves in Table A-6 in Appendix A. The engine configuration for each run consisted of the following: electronic fuel injection (EFI), high energy ignition (HEI) set at 16°BTDC at 2000 rpm with vacuum advance disconnected, exhaust gas recirculation (EGR), heads with port liners, and air injection. The primary test to test variables were air/fuel ratio and amount of EGR at the various modes. The settings at which the tests were run, the modal EGR rates and the air/fuel ratios are included along with the nine-mode EPA computer print-outs in Appendix E. The EGR rates were calculated using the CO_2 as measured in the exhaust along with the CO_2 as measured in the intake manifold in a location downstream to the input of the EGR. The following formula was used for the percent EGR calculations:

$$\text{EGR \%} = \frac{CO_2 \text{ Intake} - CO_2 \text{ Background}}{CO_2 \text{ Exhaust}} * \frac{100 - CO_2 \text{ Intake}}{100 - CO_2 \text{ Exhaust}} * 100$$

The air/fuel ratios, reported along with the EGR rates, were calculated by the formula in the Recommended Procedure[14] using test data obtained without air injection into the exhaust manifold. This method of determining air to fuel ratio does not account for the air diluted EGR which is recirculated when air injection is used. This effect would generally be less than 2 percent. In final optimization configurations involving both EGR and air injection, the air dilution in the EGR in the calculation of air fuel ratio was accounted for.

The results of Tests 217 and 218 are summarized as follows:

		Nine-Mode EPA, g/kW-hr				
Test	Run	HC	CO	NO_x as NO_2	HC+NO_x	SFC
Project Goals		--	33.5	--	6.7	0.405
217	1	1.2	35	4.8	6.0	0.392
217	3	1.5	20	6.2	7.7	0.386
217	5	1.2	36	5.2	6.4	0.399
218	1&2 Avg.	1.3	34	5.5	6.8	0.428

Note: Primary difference between Test 217 and Test 218 was that in 217 the fuel was shut off at the CT mode, while in Test 218 a throttle setting equivalent to 1700-1800 no-load rpm was maintained during the CT mode. These results illustrated that substantial reductions in HC, NO_x, and SFC were achievable. A matter of interest was that the fairly significant HC measured during the CT modes with the fuel shutoff was not accounted for in the composite results. This is an area which received closer observation in subsequent evaluations with the EFI system.

These tests completed the preliminary evaluation of the EFI system and illustrated the potential for the EFI system in meeting both the emissions and the fuel consumption goals of the project.

These results were achieved using ignition advance, relatively high levels of EGR in the 25 and 55 percent modes, rich mixture at the 90 percent mode and fuel shutoff at cut-throttle. In these evaluations, there was no apparent detonation or other reason to assume that the system would not be potentially useable. A primary contributing factor toward meeting the desired reduction in fuel consumption with the EFI system was the capability of shutting off the fuel during cut-throttle operation.

3. Reassembly of the EFI System

Before reinstalling the EFI system onto the engine, a careful examination was made of each fuel injection system component. The primary item of importance observed was that the injectors were mounted so close to the edge of the intake manifold that, when the manifold was installed normally onto the engine, some of the fuel spray could impinge on the intake manifold gasket. Therefore, during this installation, special precautions were taken to assure that the fuel could not impinge onto the gasket. In addition, the start-up enrichment circuit was carefully checked and correctly connected during this assembly. This was the apparent cause of the fuel cut-out at WOT. This also changed the relative potentiometer setting on the electronic control unit (ECU), but did not have any apparent effect on injection quality or relative fuel rate scheduling.

During cut-throttle operation with the fuel injection shutoff, the HC emission rates were generally several thousand ppm. Some potential sources for these emissions are residual fuel in the intake manifold, leaky injectors and crankcase lubricant. During this period of time, several cursory determinations were made in an effort to define the source of these hydrocarbon emissions.

First, with a cold engine and without turning on the fuel pump or the EFI Electronic Control Unit (ECU) the engine was motored at 2000 rpm. The HC emissions were initially about 550 ppm and increased with time, reaching 700 ppm in about five minutes. After five minutes the fuel pump was turned on and the injector fuel manifold pressure was 270 kPa (39 psig). No change in HC emissions were noted when the fuel pump was turned on.

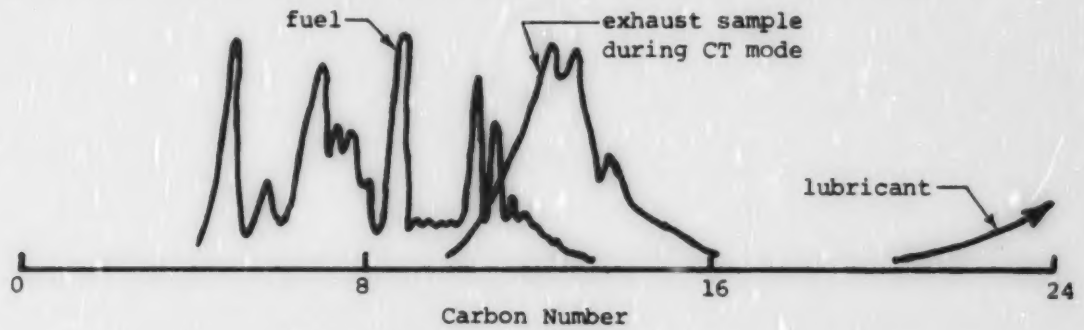
Second, the engine was warmed-up to operating temperatures and the cut-throttle was run with the ECU turned off. The initial HC emissions were around 4500 ppm and decreased to around 3500 ppm in two minutes. Then the fuel pump was shut off and the fuel pressure remained at 270 kPa. Two minutes later the fuel manifold pressure was intentionally reduced to 0.

Neither shutting off the fuel pump or reducing the manifold pressure appeared to have any definite effect on HC emissions.

Third, a CT determination was made in which the CT rpm was reduced stepwise from the initial 2000 rpm. In this evaluation, the fuel pump was left on and the ECU was turned off. The initial HC emissions level was a little over 5000 ppm. After one minute the HC emission level was about 4500. After several minutes the HC emission level was 3000 ppm at 1000 rpm and 3300 at 2000 rpm.

An HC emission rate of several thousand ppm at CT is approximately equivalent to between 50 and 100 grams per hour of hydrocarbons. If the injectors were leaking, it would appear that the rate of the leak should be affected by the fuel manifold pressure. Based on the second of the evaluations, this was not the case. Of potentially significant importance to this project is the fact that the calculations in the procedure do not take into account emissions in any mode in which the fuel flow rate is zero. Therefore, in those evaluations using fuel shutoff at CT, the calculated composite HC emission rates are somewhat lower than actual rates emitted.

A subsequent cursory attempt at defining the HC source involved chromatographic evaluation of the raw fuel, the used lubricant, and exhaust emissions trapped during the 55 percent power mode and the CT mode. The chromatographic peaks with the fuel began at a carbon number of C4 and essentially ended by C12. The trace effectively returned to initial baseline between C13 and C14. In the chromatogram for the exhaust sample during the 55 percent of maximum power mode, the trace began to rise around C13, peaked out between C16 and C18, dropped off until a relatively stable value was reached around C26 which lasted until around C30. At C30 the trace began to rise, peaked, and then dropped back down by around C32. With the CT exhaust emission sample, the trace began to rise around C10, peaked around C12 and dropped off to 10 percent of the peak by C16. From C16 through C26 there was a similarity between the trace for the 55 percent power mode and the CT mode. The chromatograph trace for the used lubricant did not move off of baseline until C16 and remained at an essentially negligible value until C20. The chromatogram traces for the raw fuel and the CT mode exhaust sample are qualitatively illustrated as follows:



These traces indicate that the CT mode exhaust HC is neither raw fuel or, except for a relatively minor portion, lubricant. Based on these traces, residual high carbon number fuel components remain as one of the prime suspects. This is an area where additional investigation would be required to adequately identify the source and define the impact of the HC emissions that have been measured during the CT mode with the fuel shut off.

In a subsequent determination, the effects of fuel injection timing were evaluated and the results are reported as Test 241 in Appendix E. These results are summarized in Table 10.

TABLE 10. EFFECT OF FUEL INJECTION TIMING

Mode	Injection Timing[a]	NO_x, ppm	Total Carbon, %	Fuel Cons., g/hr
55%	0	1112	11.64	13610
	22	1112	11.64	13560
	45	1136	11.64	13740
	202	1136	11.76	13470
	382	1136	11.76	13740
	22	1136	11.64	13610
25%	0	350	9.91	8710
	22	300	9.92	8620
	202	330	9.91	8750
	382	300	9.91	8710

[a] Crank angle degrees before the intake valve begins to open on the first cylinder in that bank of injectors.

The results of these evaluations indicated that fuel injection timing generally had a rather minimal effect on both emissions and fuel consumption.

4. Thermal Reactors

Initial evaluations were conducted with the reassembled engine to determine the ECU fuel control setting which produces results equivalent to the values previously attained. Data obtained in these evaluations with a setting of 570 on the ECU potentiometer compared reasonably well with the data previously obtained with a setting of 250 when the ECU starting circuit was incorrectly wired. In the following data for Test 233, Runs 1 and 2 were run in the afternoon of the same day and Runs 3 and 4

were made on the next day. The configuration for all runs except Test 216 was EFI, thermal reactors and HEI with standard ignition timing, and no vacuum advance. Test 216 and Runs 1 through 3 of Test 233 were all without air injection.

Test	Run	Condition	Gram/kW-hr HC	CO	NO_x	$HC+NO_x$	kg/kW-hr SFC
216	1	250 ECU[a] w/ PL	5.3	66	8.3	13.5	0.450
233	1	250 ECU[a]	5.2	74	9.2	14.3	0.433
233	2	570 ECU[b]	4.7	77	8.6	13.3	0.428
233	3	570 ECU[b]	4.1	74	8.4	12.5	0.440
233	4	With air inj. except at CT	2.5	15	8.3	10.8	0.445

[a] Starting circuit incorrectly connected
[b] Starting circuit correctly connected
Note: In these evaluations the ECU was not shut off in the CT mode.

The next evaluations (Test 234), involved varying the ECU fuel flow setting at each mode to equivalent settings to those used in the simulated test that was previously described as Test 215 Run X. The results were as follows:

Test	Run	Description	Gram/kW-hr HC	CO	NO_x	$HC+NO_x$	kg/kW-hr SFC
215	X	EFI-PL	1.2	16	12.1	13.3	0.435
234	1	EFI-TR	1.0	17	12.7	13.7	0.415
234	2	With air injection	0.1	3	13.8	13.9	0.415

Note: ECU was shut off in the CT mode in Tests 215 and 234.

The emissions were essentially the same at equivalent fuel control settings. The SFC was also essentially the same when it is taken into account that the cylinder heads with port liners have consistently increased fuel consumption by one to two percent.

Cylinder to cylinder air/fuel ratio checks (Test 235) indicated that the distribution between cylinders was better in this reassembled configuration than it was in the initial assembly. In Test 235, cylinder 7 had the highest and cylinder 2 the lowest air/fuel ratio. For the three runs, the difference in air/fuel ratio between the average value of all 8 cylinders and cylinder 7 was 2.3 percent and the difference between the average and cylinder 2 was 2.2 percent. Before Run 3, the injectors for cylinders 2

and 4 were replaced with spare injectors which were labeled as being leaner than average. No significant difference in air/fuel ratio was observed with these injectors relative to the original injectors.

Modal steady state evaluations (Tests 239 and 240) were conducted using the baseline ignition timing and manually set ignition advance. The ignition advance used was based on the vacuum advance obtained with the HEI system. The results of these evaluations are best represented by tests constructed from the modal results and designated as Test 239 Run X, Test 240 Run X, and Test 240 Run XDC. The modal selection for these constructed tests was based on lean optimization and a prime requirement was a significant SFC improvement relative to baseline. The results of the constructed tests with EFI, thermal reactors without air injection and HEI were as follows:

			Gram/kW-hr				kg/kW-hr
Test	Run	Description	HC	CO	NO_x	HC+NO_x	SFC
211 & 212		Original Baseline	5.7	34	12.1	17.8	0.45
239	X	14BTDC	0.3	6	9.4	9.7	0.42
240[a]	X	14, 24, 30 BTDC	0.3	7	9.4	9.7	0.39
240[a]	XDC	14, 24, 30 BTDC & 1350 NLRPM	0.6	8	9.4	10.0	0.42

[a] Ignition timing at the 90, 55, 25 and 10 percent torque modes was 14, 24, 30 and 30° BTDC, respectively.

Note: ECU cut-off (i.e., no fuel flow) at CT in 239X and 240X. In 240 XDC a throttle setting of 1350 rpm at no load was used during CT.

As shown by the preceding data, the use of lean optimization with the engine configuration was effective in significantly reducing all emissions and SFC. However, the reduction in NO_x was rather limited due to the large contribution of the 90 percent mode. Of the 9.4 g/kW-hr of NO_x, 5.7 was contributed by the 90 percent mode. It does not appear that lean optimization can be used to drastically reduce NO_x at the 90 percent mode without resorting to derating of the engine. As previously discussed, the decision was reached to attempt attaining the project goals without derating of the engine. The data also further illustrates the beneficial effect of ignition advance on composite SFC, and the increase in SFC due to partial opening of the throttle (Run XDC) during CT operation.

5. Backpressure and Manual EGR

Results of evaluations using the BPEGR valve are presented as Test 237 and are summarized on the next page. The system consisted of the

Test	Run	Description	Gram/kW-hr HC	CO	NO_x	$HC+NO_x$	kg-kW-hr SFC
211 & 212		Original Baseline	5.7	34	12.1	17.8	0.45
237	01R	14° BTDC, NOVA, 570 ECU	0.9	67	5.0	5.9	0.46
237	02R	14° BTDC, WVA, 570 ECU	1.0	70	9.8	10.8	0.41
237	01X	Run 01R with Mode 7 Inserted	0.4	6	6.9	7.3	0.44
237	02X	Run 02R with Mode 7 Inserted	0.5	11	11.6	12.2	0.39

EFI at a constant ECU setting and with fuel shutoff at CT, thermal reactors with air injection, HEI, and the BPEGR valve with the 7 coil spring and 0.53 orifice. The EGR flow rates reported in Appendix C are generally applicable and the vacuum advance curve is given in Appendix A. As was determined with the other fuel systems evaluated, the BPEGR valve does not appear to be properly scheduled to obtain both low emissions and improved SFC with this EFI system.

Test 243 Runs 01 through 03 were conducted using manual EGR at similar conditions to those used in the previously reported Test 217; the primary difference being the thermal reactors used in 243, whereas the port liners were used in 217. The results were as follows:

Test	Runs	Description	Gram/kW-hr HC	CO	NO_x	$HC+NO_x$	kg/kW-hr SFC
217	1 & 5	EFI-PL-EGR	1.2	35	5.0	6.2	0.40
243	1, 2 & 3	EFI-TR-EGR	0.3	10	4.1	4.4	0.39

6. Lean Optimization at WOT

Additional modal evaluations were conducted as Tests 244 and 245. Of primary interest were Runs 01 and 02 of Test 244 which involved the wide-open throttle operating condition. For Run 1, some of the primary results of the effect of air/fuel ratio on WOT operation with the EFI are summarized in Table 11. These summarized data further illustrate that the emission goals could not be met using lean optimization in the 90 percent power mode. Some nominal increase in power at the lean ratios was potentially obtainable through some advance in ignition timing but only with an increase in already unacceptable NO_x emission levels.

In Test 244 Run 02, the maximum EGR obtainable through an 0.53 diameter orifice (approximately 5 percent) was added to the conditions of Run 01. Maximum power was reduced by 6 to 7 percent and NO_x was reduced by 30 to 40 percent at the richer air fuel ratios and by only 10 to 20

TABLE 11. EFFECT OF FUEL TO AIR RATIO AT WOT

Calc. A/F	Power, kW	% BL WOT	Vac. mm	Concentration as Measured HC, ppm	CO, pct	CO_2, pct	CNO_x, ppm	SFC, kg/kW-hr
12.0	72.7	102	8	2224	6.96	10.3	329	0.35
12.8	71.2[a]	100	8	1776	4.75	11.8	647[c]	0.33
13.2	70.6	99	8	1552	3.36	12.9	1041	0.32
13.8	70.1	99	8	1184	1.87	13.9	1624	0.30
14.6	68.4	96	8	96	0.31	14.6	2147	0.30
15.0	65.8	93	8	1	0.03	15.0	2305	0.30
15.8	62.8[b]	88	8	1	0.02	15.8	2114	0.31
16.8	57.6	81	8	1	0.02	16.8	1373	0.32
17.8	50.1	71	8	1	0.02	17.8	658[c]	0.35

[a] Baseline maximum power is approximately 71 kW
[b] 90 percent of baseline maximum power is approximately 64 kW
[c] NO_x level which would enable meeting project goals
Note: 14° BTDC at 2000 rpm, with TR, no air injection.

percent at the very lean air fuel ratios. These evaluations, along with previously reported data, indicate that the required reductions in NO_x in the 90 percent mode can only be obtained using rich fuel/air mixture optimization (unless significant derating of the engine is allowed or other control methods, such as a three-way catalyst, are utilized).

In Run 04, the ignition timing was advanced while the air/fuel ratio was adjusted to maintain a nearly constant NO_x emission level. In these, as in other previously reported evaluations, 16° BTDC at 90 percent of maximum power appears to be a conservative value producing near optimum results.

Test 245 Runs 01R through 03R evaluated the effect of ignition timing on NO_x emissions at relatively constant rich, near stoichiometric, and lean fuel/air ratios in the 55 percent of maximum power mode. For as-measured NO_x concentrations around 600 ppm (the approximate value necessary to meet project goals) the SFC ranged from about 0.326 at lean ratios to 0.34 at rich ratios, or a little under five percent variation. Since the 55 percent mode normally contributes about 25 percent of the total composite fuel flow, this less-than-five percent variation in fuel flow would change the composite nine-mode SFC by about one percent. Lean optimization at the 55 percent of maximum power mode, therefore, appears to result in some, but not any really substantial, improvement in SFC.

F. Selection and Assembly of a System for Service Accumulation

Based on the results of the optimization evaluations, a system selection was made and an optimized engine was assembled for use in the service accumulation evaluation.

1. System Selection for Service Accumulation

In selection of the system to undergo service accumulation, several criteria were initially applied. These criteria are listed in Table 12.

TABLE 12. CRITERIA USED IN FINAL SYSTEM SELECTION

(1) The system should utilize currently in-use or reasonably proven components.

(2) The system should have potential practical application to heavy-duty gasoline engines by 1979.

(3) The system should minimize usage of devices or methods currently known to have questionable effectiveness.

(4) The possibility should appear good that a reasonable, self-contained, automatic system could be expeditiously assembled for use in the service accumulation evaluation phase of this project.

Of the fuel systems evaluated, only the carburetor and the electronic fuel control system met all four of these criteria.

Using the carburetor along with emissions controls selected for evaluation in this project, the HC emissions were reduced to acceptable levels only when partial opening of the throttle or fuel shutoff was used during the CT mode. When using partial opening of the throttle to reduce HC, however, the specific fuel consumption goals were not attained. In addition, there appears to be some cause for questioning the overall effectiveness of this method for controlling HC emissions during the CT mode.(10, 13)

The project goals were attained using electronic fuel injection along with thermal reactors and EGR; and each of these systems essentially met the four basic criteria listed in Table 8. For the service accumulation demonstration, it was mutually agreed with the EPA Project Officer to use the EFI, thermal reactors with air injection, EGR and the HEI system with vacuum advance.

2. Assembly of the System for Service Accumulation

The effort was then directed toward assembling a system for service accumulation which requires a minimum of external control. Two initial attempts were Tests 252 and 254 and the results are summarized as follows:

Test	Description	Gram/kW-hr HC	CO	NO_x	$HC+NO_x$	kg/kW-hr SFC
	Project Goals	-	33.5	-	6.7	0.405[a]
252	EFI-TR-HEI-EGRMBP	0.3	14	3.4	3.7	0.419
254	EFI-TR-HEI-EGR6010	0.4	11	4.1	4.4	0.414

[a] Based on a 10 percent improvement from baseline

These two systems met all of the initial project goals with the exception of SFC.

A 23-mode test was run with the same configuration as used in the nine-mode EPA Test 252. The results compared with the baseline results were as follows:

Test	Description	Gram/kW-hr HC	CO	NO_x	$HC+NO_x$	kg/kW-hr SFC
209	Baseline	10.6	49	12.1	22.7	0.429
252	EFI-TR-HEI-EGR	0.4	23	6.8	7.2	0.386

Significant improvements were evident with all emissions and with SFC. The primary improvement was in HC which was reduced by greater than 96 percent.

A self-contained automatic system was then assembled which achieved emission and SFC results essentially equivalent to results obtained during manually operated and modally optimized evaluations. The system is shown in Figure 8 and consists of electronic fuel injection (EFI) with fuel shut-off during cut throttle, thermal reactors (TR) with air injection (AI), exhaust gas recirculation (EGR), and high energy ignition (HEI) with vacuum advance.

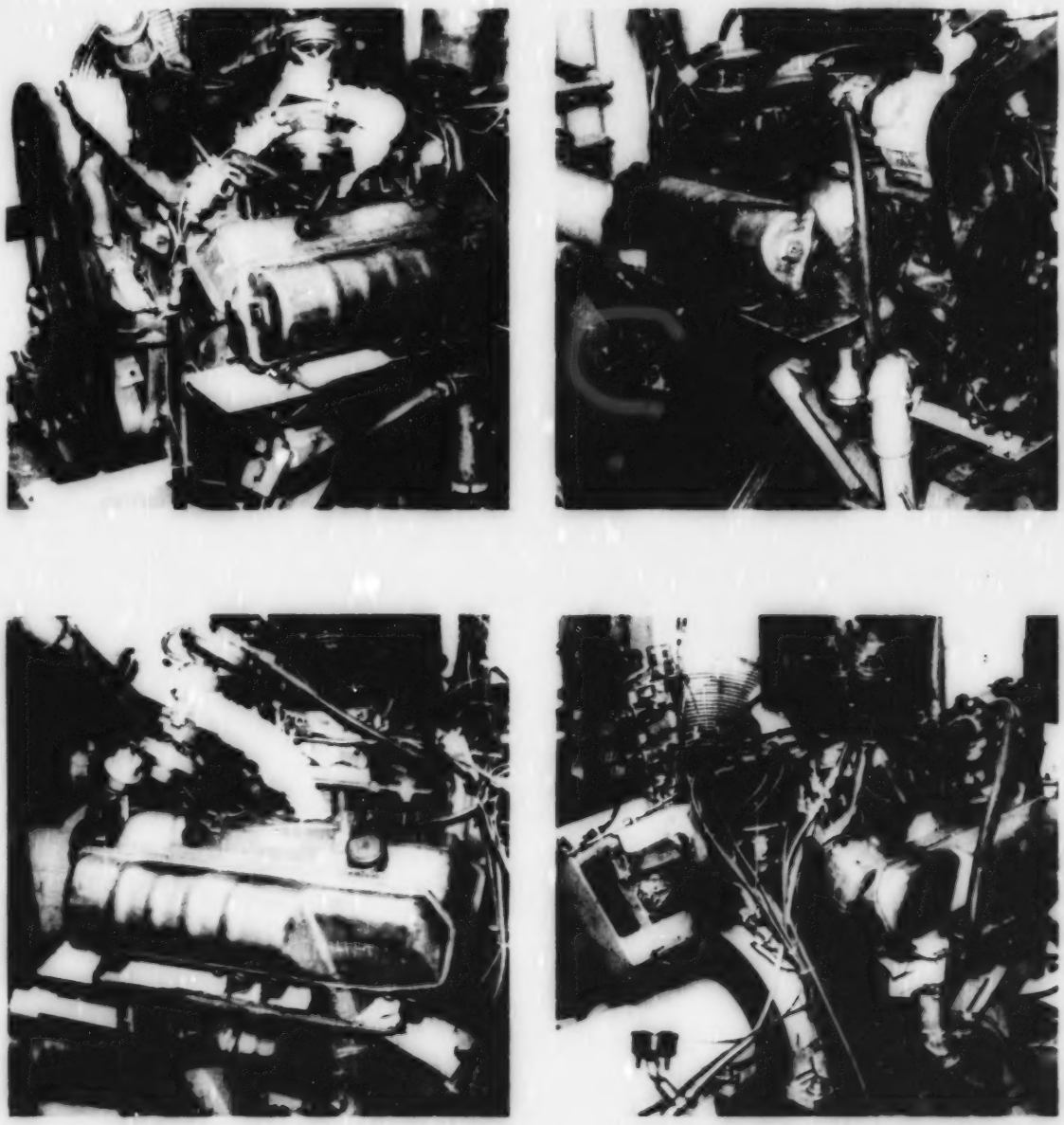


Figure 8. Optimized system consisting of EFI, thermal reactors, EGR and HEI.

The operating conditions and the results of repeated nine-mode EPA evaluations, using this final system, are reported in Appendix F. (Included are the results of duplicate 23-mode evaluations). These nine-mode EPA results are summarized in Table 13.

TABLE 13. EMISSIONS AND SFC FOR DURABILITY SYSTEM

Test	Description	Gram/kW-hr HC	CO	NO_x	$HC+NO_x$	kg/kW-hr SFC
211 & 212	Baseline	5.7	34	12.1	17.8	0.450
---	Project Goals	---	33.5	----	6.7	< 0.405
261, 262, 263 & 265	Emis. Cont. Sys.[a]	0.4	12.2	4.5	4.8	0.392

[a] EFI-TR WAI-EGR-HEI WVA

As shown, project goals were achieved using primarily current technology fuel and emission control systems. As previously indicated, no method has been located for directly correlating operation on the dynamometer with driveability in a vehicle. There has not been, however, any indication from the dynamometer operation that this engine system would not be driveable.

As previously reported, this procedure does not account for the HC during CT since the fuel flow is zero and the carbon balance procedure calculates the emissions as zero when the fuel flow is zero. The actual HC emission rate during CT (based on the measured HC emission values) is estimated to approach 0.7 g/kW-hr. This value has been calculated as follows:

- HC $\sim$ (3,200 ppm/45,000 ppm) * (1300 g/hr) $\sim$ 95 g/hr (Based on Test 213)
- (90 g/hr) * (.143) $\sim$ 13 weighted gm/hr
- 13 g/hr / 19 kW $\sim$ 0.7 g/kW-hr (0.5 g/bhp-hr)

Even if this approximate 0.7 g/kW-hr were added to the composite $HC+NO_x$ value of 4.8, the resulting value of 5.5 would still remain below the goal of 6.7.

The results of the duplicate 23-mode evaluations are summarized on the next page.

Test	Description	Gram/kW-hr HC	CO	NO_x	HC+NO_x	kg/kW-hr SFC
209	Baseline	10.6	49	12.1	22.7	0.429
264	Emis. Cont. Syst.	0.3	6	6.8	7.1	0.393

A few compromises were necessary in order to make this a self-contained and automatic operating control system. These apply primarily to very low power operation at slow to medium engine speeds where the EGR rate is somewhat higher than optimum. This very low power operation, however, is of minimal importance in the nine-mode EPA procedure. The 23-mode procedure, on the other hand, places somewhat greater emphasis on the low power modes at an engine speed of 1200 rpm.

The EFI is operated at a constant setting on the ECU and fuel flow is shut off during CT operation by a vacuum operated switch. The decision to use a constant setting on the ECU was reached after it was determined that results could be obtained which were essentially equivalent to modally optimized results. Since fuel flow rate in this EFI system is controlled by the engine speed and manifold vacuum, however, a constant setting on the ECU required some balancing of the EGR rate with the ECU schedule. (Note - time requirements, proprietary considerations and other factors made it inadvisable to attempt making internal changes to the ECU). External control of the ECU could possibly have been developed had the previous approach not been successful.

The most difficult system to incorporate was an EGR system. All available EGR valves (over a half dozen different units were tried) did not have and could not readily be modified to have the appropriate schedule. As an expediency, since this project was not intended as an EGR development project, two EGR valves were utilized in parallel in the final system. The valves utilized were modified backpressure EGR valves. One valve operates in a manner in which some flow control is obtained by exhaust back-pressure. The other valve provides the additional exhaust recirculation required around the 55 percent power mode. The effective EGR rates along with ignition timing for the nine-mode EPA procedure were as shown at the top of the next page. The equation used is the same as that used in previous calculations, with the addition of a term (total carbon/15) to account for the amount of air injection in the exhaust. As previously mentioned, the EGR rate at the 10 percent power mode was somewhat higher than optimum. This, however, did not result in any noticeable misfire and the 10 percent power mode is not a significant factor in the nine-mode EPA procedure.

Mode	Percent Power Setting	EEGR, %[a]	Typical Ignition Timing, °BTDC
1	Idle	0	5
2, 4, 6, 8	25%	13-14	29
3	55%	11-12	21
5	10%	16-17	30
7	90%	2	16
9	CT	0	5

[a] Using EEGR = EGR % * $\frac{\text{Total Carbon}}{15}$

The HEI system was used for two primary reasons; the essentially satisfactory vacuum advance curve and the fact that HEI appears to have become the dominant system in light-duty applications and yearly is being used in more heavy-duty applications. In the nine-mode EPA evaluations, the 90 percent of maximum power mode is run two degrees advanced relative to the manufacturer's specified value for the baseline configuration. The manufacturer specified timing, however, was used in the WOT maximum power determinations which were used in setting the power modes in the nine-mode EPA procedure.

The ignition timing advance curve used compares well with the advance curve used in the Cadillac engine with EFI. Based on this similarity to the Cadillac advance curve and the high fuel/air ratio along with a couple percent EGR in the 90 percent power mode, no detonation should be expected to occur in any modes of the nine-mode EPA procedure.

IV. SERVICE ACCUMULATION DEMONSTRATION

Following completion of the optimization evaluations, the engine in the optimized systems configuration was moved to a durability test stand. This test stand had recently been used in the evaluation of a 1977 model heavy-duty durability data engine. This section of the report describes the service accumulation demonstration; including the facility, equipment, instrumentation, procedures and results. The engine configuration has been previously described in Section III.F. of this report. In brief, the engine configuration consisted of a 1975 model heavy-duty gasoline engine, electronic fuel injection with the fuel shut off at CT, exhaust thermal reactors with air injection, exhaust gas recirculation, and high energy ignition with vacuum advance. During the 750 through 1500 hours of service accumulation, an oxidation catalyst was included as an add-on in the exhaust system.

A. Service Accumulation Schedule and Emissions Test Sequence

The service accumulation schedule and emissions test sequence used in this project follow the requirements in the proposed rules for 1979 model year heavy-duty gasoline engines.[15] This proposed schedule and sequence differ from the currently applicable heavy-duty service accumulation schedule and nine-mode emissions test cycle.

1. Service Accumulation Schedule

The service accumulation schedule used in this project is given in Table 14. This schedule was designed to meet the requirements in the proposed rules, which are summarized in Appendix Table A-7. The general format and sequence were based on a service accumulation schedule which was recently used on a 1977 model heavy-duty durability data engine. This schedule was reviewed by the certification section at EPA and they verbally replied that it met the basic requirements given in the proposed procedure.

This schedule utilizes eight steady state modes, plus a high speed transient, and has a total cycle time of 15 minutes. The designed average engine speed for the cycle is 1672 rpm. Required duration of CT operation was attained in mode 8 which has a total time in mode of 275 seconds. This is in keeping with a steady state type of cycle and the then available durability test facility, which had single speed CT capability.

TABLE 14. SERVICE ACCUMULATION SCHEDULE USED IN THIS PROJECT

Sequence Number	Mode	Engine rpm	% of Max. Torque[a]	Time in Mode, seconds	% of Time in Mode
1	Idle	600	Idle	105	11.7
2	Cruise	1550	25	55	6.1
3	PTD	1550	10	135	15.0
4	Idle	600	Idle	105	11.7
5	PTA	2000	55	30	3.3
6A	PTA	3300	55	1	0.1
6B	PTA	3200	55	69	7.7
7	FL	2000	90	125	13.9
8	CT	2000	CT	275	30.6
Typ. Avg. Cycle rpm		1672	Totals	900	100.

[a]Percent of maximum torque measured at the respective engine rpm

The primary differences between the current and the proposed service accumulation schedule requirements (other than using percent of maximum power rather than intake manifold vacuum settings) are shown in Table 15.

TABLE 15. SERVICE ACCUMULATION SCHEDULE REQUIREMENTS

Mode	Modal Condition		Modal Time in Percent		Modal Time in Sec Based on 15-Min Cycle	
	Current, in. Hg	Proposed, % Torque[a]	Current[17]	Proposed[15]	Current	Proposed
Idle	Idle	Idle	23	23	207	207
CT	CT	CT	14	31	126	279
PTD	19	10	6	15	54	135
Cruise	16	25	31	6	279	54
PTA	10	55	14	11	126	99
FL	3	90	12	14	108	126

[a] Percent of the maximum torque obtained at that operating speed.

The engine speed requirements in the proposed schedule remain the same as in the current schedule. Average speed shall be between 1650 and 1700 and up to 0.5 percent of the cycle time must be operation at a speed in excess of 3200 rpm. Maximum allowed cycle time is 15 minutes.

The current service accumulation schedule uses the same relative modal weighting factors as used in the nine-mode emissions test procedure. As shown in Table 15, the proposed schedule more than doubles the time spent in the CT and the PTD (10% power) modes and reduces the time spent in the Cruise (25% power) mode from 31 to 6 percent of the total cycle time.

2. Emission Test Sequence

The emissions test cycle given in the recommended procedure[14] and the proposed rules[15] was used for each 125 hour test throughout the 1500 hours of engine service accumulation. This cycle was previously described in Section II.D. of this report. One of the primary differences between the proposed nine-mode cycle and the current nine-mode cycle is that the modal settings are on the basis of percentages of maximum torque rather than on fixed manifold vacuum settings.

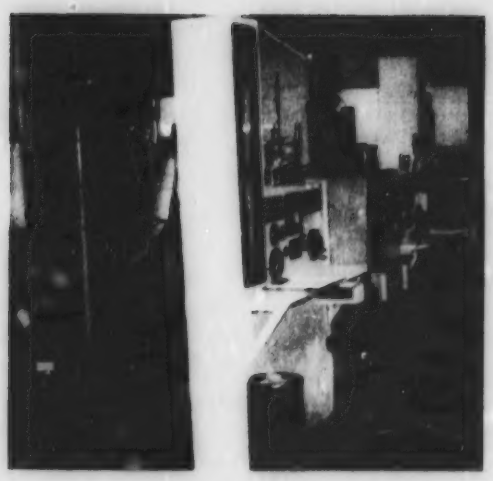
B. Durability Test Stand and Instrumentation

The durability test stand facility used in this project is located in the Emissions Research Department at Southwest Research Institute. The altitude of this testing facility is 248 meters (813 ft) above sea level. Several views of the durability test facility, along with a view of the engine and the oxidation catalyst, are shown in Figure 9.

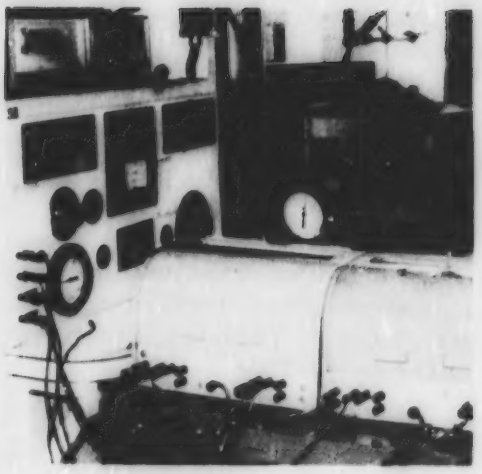
1. Dynamometer System

The stationary engine dynamometer used was a 175 hp Midwest Eddy Current absorption, dry gap electric dynamometer, Frame MD 1014. Absorbing capability of the dynamometer was 131 kW (175 hp) over the speed range of 2500 to 6000 rpm. Motoring of the engine was accomplished using a Dayton 37 kW (50 hp) electric motor driving the dynamometer through a gear belt-cog pulley positive drive system and a clutch assembly. This dynamometer and electric motor assembly is shown in Figure 9.

During the CT mode of the emission cycle and the service accumulation cycle, motoring at nominal 2000 rpm was affected by the engagement of the clutch. The clutch assembly, consisting of a C-60 Chevrolet truck (350 CID) bell housing assembly including engine flywheel to pinion shaft, clutch, pressure plate and throwout bearing, was mounted on the motoring shaft support pedestal. Only the clutch pressure plate and splined pilot shaft rotate continuously with the Midwest dynamometer shaft.

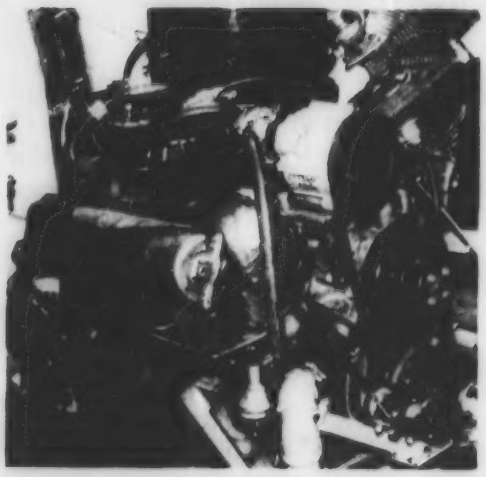


Overall View

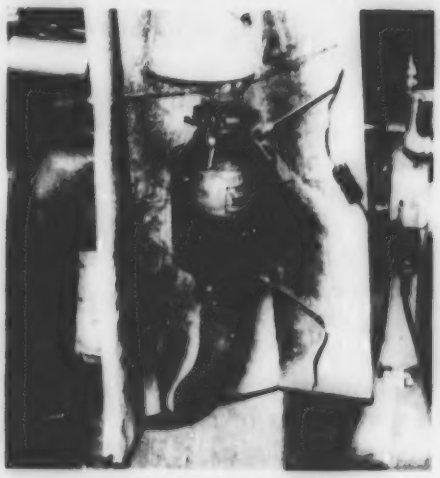


Control Panel and Data-Trak

Engine-Dynamometer Installation



Optimized Engine



Oxidation Catalyst

Figure 9. Test facility used in the service accumulation demonstration

For measurement of torque, the dynamometer lever arm actuated a Baldwin-Lima-Hamilton BLH strain gage load cell Type U3G1. A Bell and Howell mv Isolated Transmitter Model 18-115 was used with the load cell. Digital readout was provided by a Newport Model 200A panel meter. A system of known weights were used to precalibrate the load cell read-out system and for dynamometer calibration prior to each emissions test.

2. Durability Cycle Control System

The engine-dynamometer control system utilized a Research Incorporated Programmed - Closed Loop Speed Controller - Closed Loop Load Controller. The system and individual components are illustrated in Figure 10. The Research Incorporated Model 660D Digital Data-Trak Programmer and Model 2204 excitation module, Model 2201 speed controller, and the L&N Model 10970 Electropneumatic Converter and Honeywell actuator MP909B are the major elements of the automatic control system. A partial view of the Data-Trak programmer was shown in Figure 9.

This cycle controller was programmed using punched tape to operate the 15 minute service accumulation schedule for this 1500 hour evaluation. This control system was also used to maintain constant 2000 ± 100 rpm during the emissions test cycle. During emissions tests, however, the engine throttle was operated manually.

3. Engine Parameter Instrumentation

Speed - For determination of engine speed, a Herman H. Sticht Co. Model ACA-2 tachometer generator was driven directly from the front end of the engine crankshaft. The generator supplied a signal to the control system, the recorder, and to a Model 451 Standco panel meter.

Manifold Vacuum and Exhaust Backpressure - A Viatron Model 108 vacuum transducer provided the manifold vacuum electrical signal to the recorder. In addition, a mercury manometer was utilized as the primary reference and for calibration, and a gauge was used as an assist in running the emissions cycle. Mercury manometers were used for measurement of exhaust backpressure.

Fuel Flow - Fuel flow rate was determined using a Flo-Tron, Inc. Model 10E mass flow transmitter in conjunction with a Flo-Tron recirculating tank. The flow rate was displayed on a digital panel meter and was permanently recorded on strip chart.

Temperatures - Thermocouples, an L&N Model 8246 multi-position rotary switch and a Doric Model D5500 digital thermocouple readout

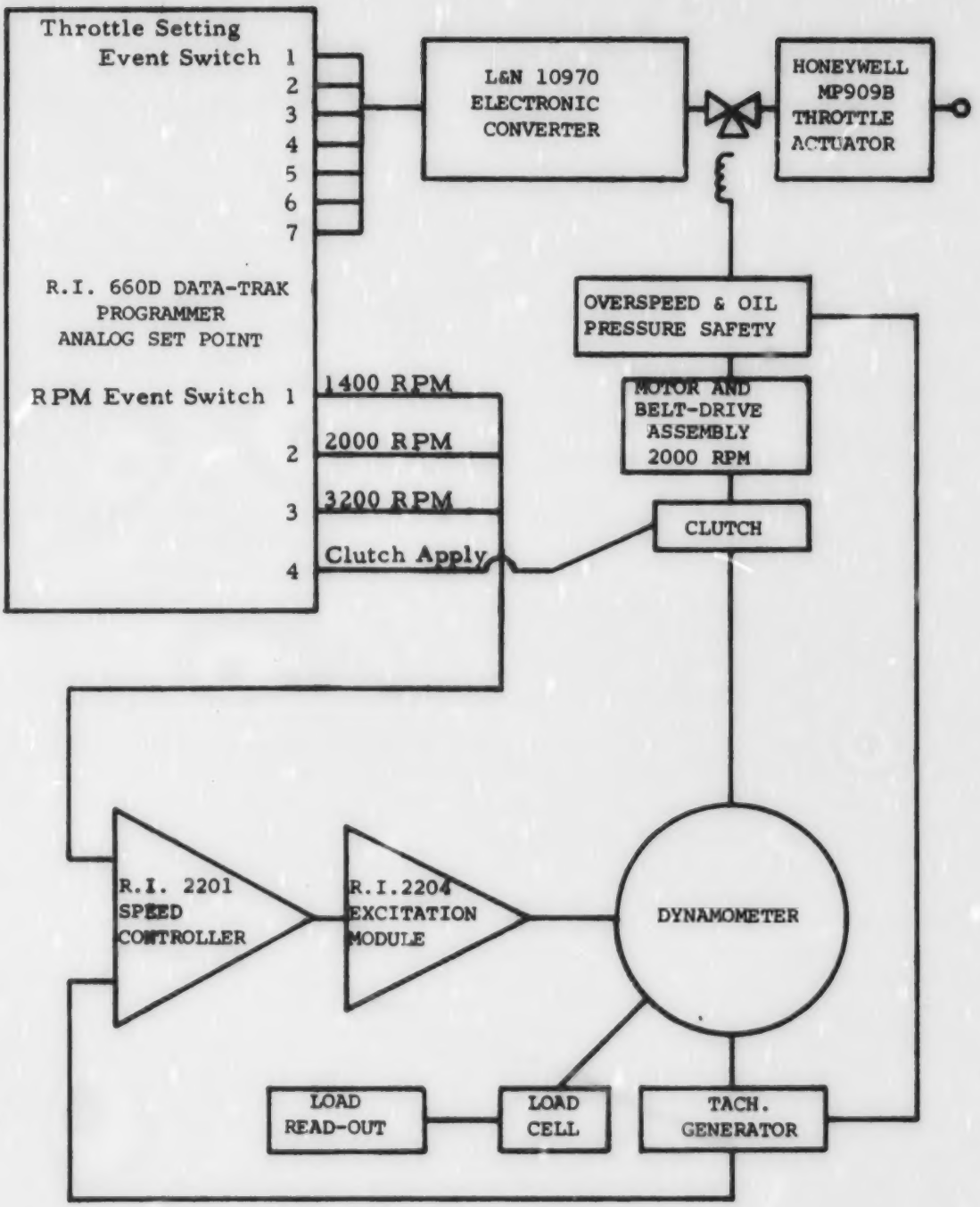


Figure 10. Functional diagram of the engine and dynamometer control system.

were utilized for temperature measurements. A precision mercury thermometer was utilized as the primary reference for calibration of the ambient and intake air temperature thermocouples.

Barometric Pressure and Humidity - Barometric pressure was determined within the test area using a mercury barometer. Humidity, in terms of temperature and relative humidity, was measured using a General Eastern Model 400 C/D Relative Humidity and Temperature Indicator.

Other Pressures - Conventional Bourdon tube pressure gages were used for monitoring such parameters as engine oil gallery pressure, dyno water supply pressure, and fuel pump outlet pressure.

Safety Shutdown Systems - Systems were employed to automatically shut down the engine in the event of low oil pressure, engine overspeed, and overheat of engine or dynamometer cooling water.

4. Sampling and Analytical System

Sampling System - The exhaust sampling probe consisted of a 9.5 mm (3/8 inch) outside diameter (7.7 mm ID) stainless steel tube with the end welded closed and nine holes 2.4 mm (3/32 inch) in diameter equally spaced and randomly oriented. This probe was installed in the exhaust pipe 2.8 meters (9.2 feet) downstream of the engine exhaust manifold and 150 mm (6 inches) downstream of the muffler. The length of the 9.5 mm OD heated sample line was approximately 8 meters (26 feet). The sampling system, except for a few minor deviations, followed the schematic illustrated in Figure D79-1 in the Proposed Rules[15] (this figure was reproduced as previous Figure 2 in Section II.C. of this report).

Emission Instruments - Multirange Beckman 315A non-dispersive infrared analyzers were used for measurement of CO and CO_2. NO_x was measured using a SwRI fabricated chemiluminescence and HC using an SwRI fabricated flame ionization detector. The nominal instrument ranges used in the emissions tests are listed as follows:

Emission	Nominal Full Scale
CO	3500, 7000, 17000 ppm
CO_2	16 percent
HC	100, 200, 400, 800, 1600, 3200, 6400, 12800 ppm
NO_x	100, 300, 1000, 3000 ppm

Recorders - Four dual-pen Texas Instrument Servo/Riter II strip chart recorders were used to record emissions and engine operating parameters. The utilization was as follows:

Recorder	Emission or Parameter Recorded
1	CO and CO_2
2	HC and NO_x
3	LOAD and RPM
4	MAN. VAC. and FUEL FLOW

Computer Data Processing System - The strip charts of HC, CO, CO_2, NO, Load, RPM, Fuel Flow and Manifold Vacuum obtained during emission tests were manually read and reduced after each emission test. Intake air temperature, humidity, barometric pressure and various other pressures and temperatures were manually recorded during the nine-mode test. Trained chart readers transferred the readings to computer input sheets from which computer cards were keypunched and verified.

The cards were then entered into the CDC 6600 computer facility of the McDonnel-Douglas Company in Santa Barbara, California via dedicated phone lines. This batch type computer performs the calculations, computes correction factors and applies and weights the values as per requirements in the applicable procedure. Observed, weighted and corrected data were then printed out in the Southwest Research Institute computer terminal. The computer printouts are defined in Table A-4 in Appendix A.

Calibration and Span Gases - Instrument calibrations were performed monthly using gases referred to as Golden Standards. The Golden Standard gases have all been either named at the Environmental Protection Agency or using Bureau of Standards reference gases. Span gases are named from these Golden Standard gases and are rechecked during each instrument calibration. A span gas was provided for each instrument range used.

C. Oxidation Catalyst

The oxidation catalyst, included as an add-on during the last 750 hours of service accumulation, was an Engelhard Exhaust Gas Purifier PTX 7.25-2-3MOD3. This unit contains a monolith substrate approximately 160 mm in diameter by 160 mm in length (about six by six inches). It was installed between the "Y", joining the right and left exhaust of the engine, and the muffler. The centerline of the catalyst was located about 1.5 meters (five feet) downstream of the exit from the left bank thermal reactor. As received, the inlet and outlet to the catalyst were slightly less than 50 mm (two inches) in diameter. Therefore, as discussed with the Engelhard

representative, the inlet and outlet cones were cut-back to a diameter of 75 mm (three inches) and Marman clamp plates were heliarced onto the inlet and outlet. Thermocouples were installed in the inlet and outlet of the catalyst.

A picture showing the catalyst installation was included in the preceding Figure 9. A section of exhaust pipe the same length as the catalyst assembly was also fabricated. This section of exhaust pipe was used to replace the catalyst for emissions testing of the engine in the original optimized configuration.

Exhaust backpressure was approximately doubled with the catalyst installed. The values for each modal condition in the nine-mode EPA procedure and for WOT at 2000 rpm were as follows:

Mode	Percent of Max. Torque	Exhaust Backpressure, mm Hg	
		Without Catalyst	With Catalyst
1	Idle	1	3
2, 4, 6 & 8	25	5	12
3	55	10	23
5	10	3	8
7	90	23	43
9	CT	1	3
-	WOT	30	58

It is important to note that, as per agreement with the EPA Project Officer, no system optimization was conducted with the catalyst installed. The increase in exhaust backpressure can affect both the residual exhaust remaining within the cylinder during the exhaust stroke and the rate of exhaust gas recirculation.

D. Emissions Test Results During Service Accumulation

This section presents the results of the emissions tests and the calculation of the deterioration factor. It should be noted that the emissions test procedure used in this project differs from the current nine-mode certification procedure.

1. Emissions Tests Results

For the first 750 hours, the engine configuration consisted of electronic fuel injection with the fuel shutoff at cut-throttle, exhaust thermal reactors with air injection, exhaust gas recirculation and a high energy ignition system. At 750 hours of service accumulation, a heavy-duty oxidation catalyst was installed in the exhaust system. From this point

on, all service accumulation hours were with the catalyst installed. After each 125 hours of operation, however, emissions tests were conducted both with and without the catalyst installed.

The emissions test results during the service accumulation demonstration are included in Tables G-2 through G-16 in Appendix G and are summarized in Table 16.

TABLE 16. EMISSIONS RESULTS DURING SERVICE ACCUMULATION

Without Oxidation Catalyst

Test Number	Durability Hours	Emissions, g/kW-hr				kg/kW-hr
		HC	CO	NO_x	HC+NO_x	SFC
Project Goals		---	33.5	----	6.7	0.405[a]
Optimization Eval.		0.4	12.2	4.5	4.8	0.392
0-6	000[b]	0.29	10.37	3.74	4.03	0.386
1-1	125	0.42	12.67	3.52	3.94	0.387
2-2	250	0.33	16.31	3.27	3.60	0.384
3-1	375	0.46	14.46	3.54	4.00	0.378
4-3	500 Pre	0.35	10.89	3.87	4.22	0.399
5-1	500 Post	0.52	8.40	3.94	4.46	0.392
6-3	625	0.36	14.53	3.59	3.95	0.412
7-2	750	0.40	23.33	2.64	3.04	0.397
9-2	875	0.42	17.21	3.06	3.48	0.405
11-2	1000 Pre	0.33	27.55	2.83	3.16	0.404
13-2	1000 Post	0.32	12.60	3.29	3.61	0.390
15-1	1125	0.36	19.41	3.21	3.56	0.389
17-2	1250	0.39	9.99	3.62	4.01	0.405
19-1	1375	0.99[c]	12.72	3.59	4.58	0.399
21-1	1500	0.36	14.43	3.53	3.89	0.390
Average 000-500		0.37	12.9	3.59	3.96	0.387
Average 500-1000		0.41	18.2	3.21	3.62	0.402
Average 1000-1500		0.48	13.8	3.45	3.93	0.395
Average 000-1500		0.42	15.0	3.42	3.84	0.394
Standard Deviation		0.17	5.2	0.37	0.43	0.010
Deterioration Factor		-	2.10	-	0.00	0.011
125 Hours + D.F.		-	14.77	-	3.94	0.398

[a] Based on a 10 percent improvement from baseline

[b] The basic engine was operated for 468 hours in the optimization evaluations.

[c] Engine misfire occurred in the Idle and some of the low power modes.

Up to the 1000 hours, the NO_x emissions generally decreased while CO and to some extent the SFC increased. The primary contributing factor associated with the increase in composite CO was the significant CO increase in the 90 percent power mode. The CO emission rate in this mode increased from initial values below 0.3 percent to values above 1.0 percent. Contributing causes for the changes in emissions and SFC are discussed in Section F which reports maintenance. The results in Table 16 show that the basic goals of this project were met.

Emissions and SFC results during the 750 hours of operation with the oxidation catalyst installed in the exhaust system are included in Tables G-17 through G-25 in Appendix G and are summarized in Table 17. The oxidation catalyst produced substantial reduction in HC in all modes. Substantial reduction in CO emissions was achieved in those modes having sufficient oxygen available in the exhaust.

Composite NO_x emissions decreased and SFC increased with the oxidation catalyst installed. The SFC increase is probably attributable to the increase in exhaust backpressure. Possible causes for the NO_x reduction are increased exhaust residuals in the combustion chamber due to the increased backpressure and/or the catalyst acting as a reduction catalyst. The 90 percent power mode was a significant source of NO_x, CO and exhaust heat. Under these conditions the catalyst could have been operating as a reduction catalyst. Experiments to determine the cause of the NO_x reduction were not performed.

TABLE 17. EMISSIONS TEST RESULTS WITH OXIDATION CATALYST

		With Oxidation Catalyst				
Test Number	Catalyst Hours[a]	Emissions, g/kW-hr HC	CO	NO_x	$HC+NO_x$	kg-kW-hr SFC
8-1	0	0.07	20.1	1.75	1.88	0.410
10-1	125	0.07	19.28	1.70	1.81	0.414
12-1	250 Pre	0.11	27.17	2.37	2.48	0.408
14-1	250 Post	0.04	7.75	1.98	2.02	0.396
	375	0.07	18.50	2.64	2.61	0.396
	500	0.08	9.16	2.45	2.53	0.398
	625	0.08	13.49	2.15	2.23	0.409
	750	0.08	15.49	2.50	2.58	0.402
Average 000-750		0.08	16.38	2.19	2.27	0.404
Standard Deviation		0.02	6.32	0.35	0.33	0.007

[a] Catalyst hours equals engine durability hours minus 750.

2. Determination of the Deterioration Factor

The deterioration factors for $HC+NO_x$ and for CO were calculated using the emissions test data for service accumulation hours 125 through 1500. Both the pre- and post-maintenance test data at 500 and 1000 hours were included in the calculation. Deterioration factors were 0.00 g/kW-hr for $HC+NO_x$ and 2.10 g/kW-hr for CO. The service accumulation emissions test data and the best fit straight lines are shown plotted in Figure 11. The 125 hour values plus the deterioration factors were 3.94 g/kW-hr for $HC+NO_x$ and 14.77 g/kW-hr for CO.

E. Maximum Power and Exhaust Temperatures

This section presents the maximum power as determined and used in setting up the service accumulation modal conditions, the corrected maximum power determined before each emissions test, and the exhaust temperatures at the exit of the thermal reactors and the oxidation catalyst.

1. Setting Up Service Accumulation Modal Conditions

Maximum power output was determined at each of the three speeds included in the service accumulation schedule. These values were obtained at atmospheric conditions approximating the average expected conditions within the durability test cell. The maximum power and the service accumulation modal conditions were as follows:

		Service Accumulation Schedule			
RPM	Maximum Power, kW	Mode	Power, kW	Fuel, kg/hr	Man. Vac., mm Hg.
Idle	-	1 & 4	0	1.8	∿ 430
1550	53.2	2	13.3	6.6	330
1500	"	3	5.3	5.6	381
2000	71.2	5	39.2	12.9	175
2000	"	7	64.1	19.9	53
3200	109.2	6	60.1	22.3	170
2000	-	8	0	0	595

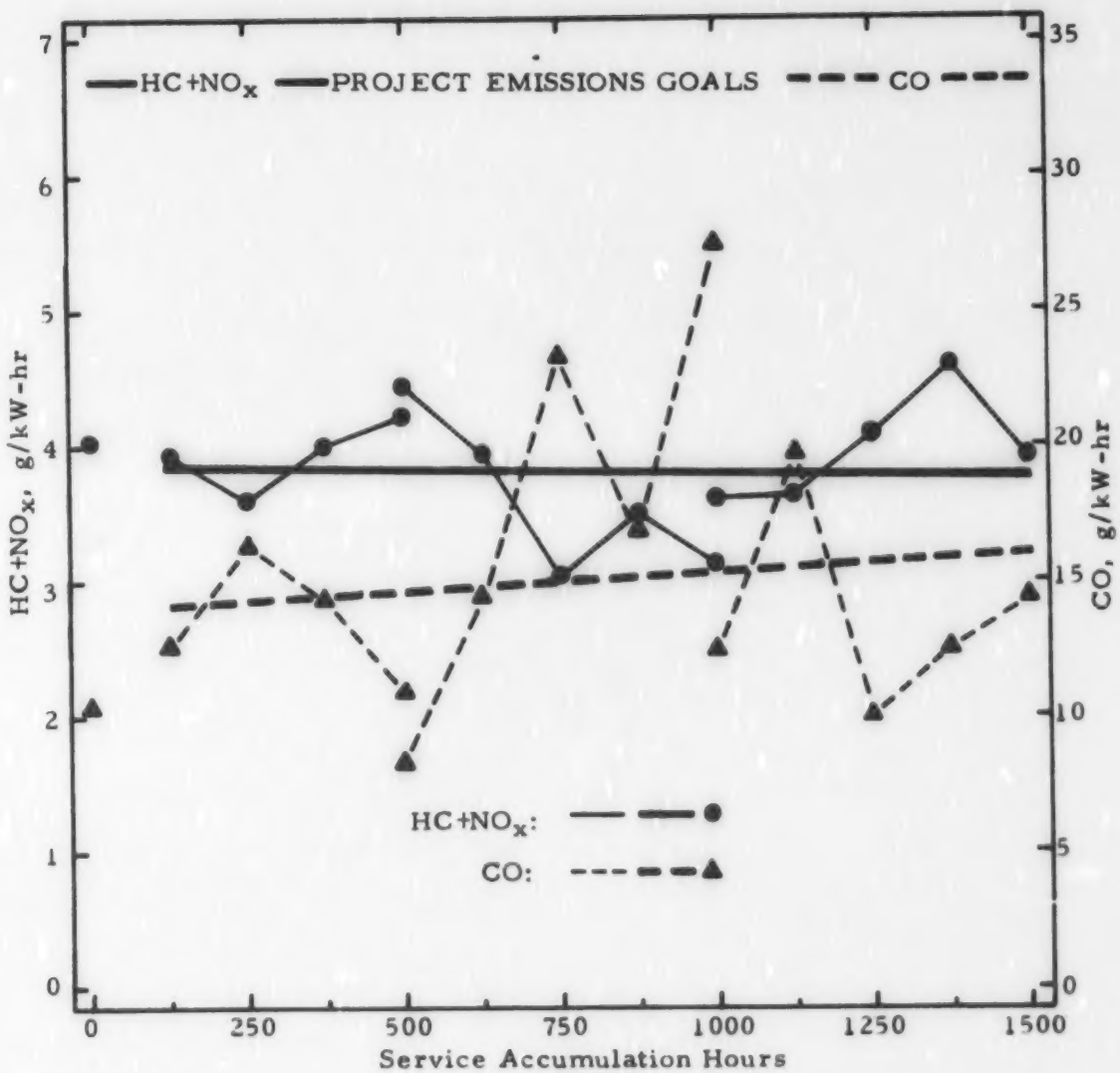


Figure 11. Plot of the emissions results for the service accumulation demonstration.

The modal power was the control parameter utilized throughout the service accumulation demonstration.

2. Maximum Power Determined for Each Emissions Test

The emissions procedure[14] requires using modal conditions established on the basis of maximum power determined, with a warmed up engine, prior to each test. This requirement was followed for the emissions testing during the service accumulation demonstration. In Figure 12, the determined maximum powers have been adjusted to uniform atmospheric conditions using the formulas given in the recommended procedure. This adjustment of the maximum power has been made to enable direct comparison of the values.

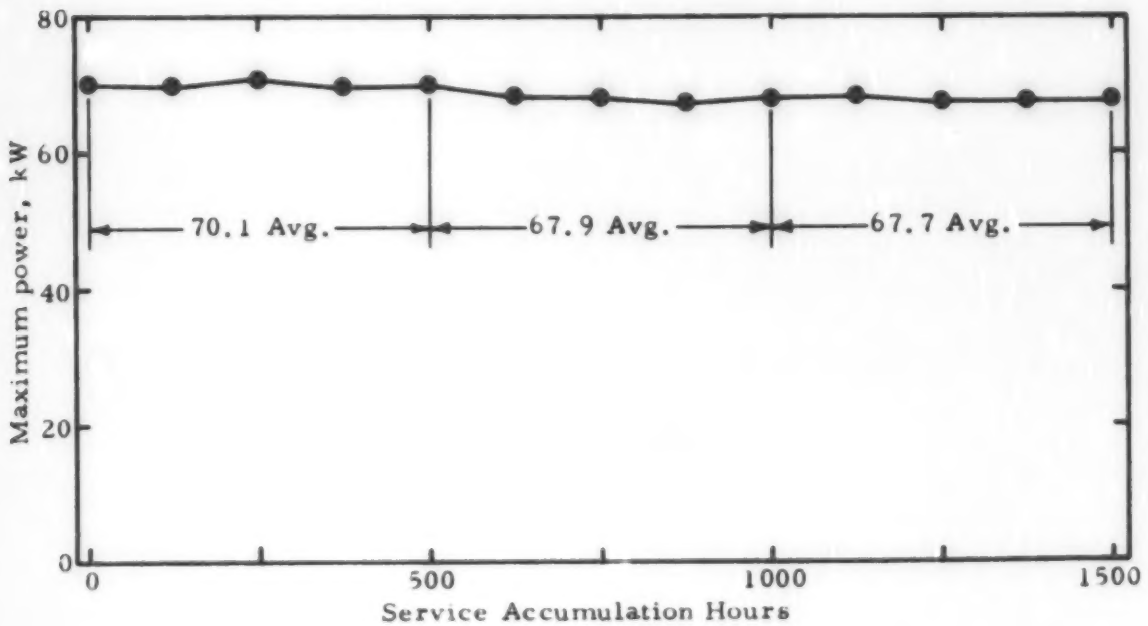


Figure 12. Maximum power determinations for setting up emissions tests.

As shown in Figure 12, the maximum power remained essentially constant for the first 500 hours of service accumulation. Between 500 hours and 625 hours, an approximate three percent reduction in maximum power occurred. The maximum power from 625 hours through 1500 hours then remained essentially constant at this somewhat reduced level of power output. The average maximum power output for 1125 through 1500 hours of service accumulation was 96.6 percent of the power output for the first 500 hours.

With the addition of the oxidation catalyst, the maximum power output was reduced approximately one kW relative to maximum power without the catalyst. This reduction in maximum power with the oxidation catalyst installed was apparently due to the increase in exhaust backpressure.

3. Maximum Exhaust Temperatures

Maximum specified operating temperatures were 1066°C (1950°F) for the thermal reactors and 982°C (1800°F) for the oxidation catalyst. The recommended range for the oxidation catalyst was 371 to 871°C (700 to 1600°F). Nominal operating temperatures attained during the emissions cycle and the service accumulation schedule are given in Table 18.

TABLE 18. NOMINAL THERMAL REACTOR AND OXIDATION CATALYST OPERATING TEMPERATURES

Emissions Cycle[a]					Service Accumulation Sequence				
		Temperature, °C						Temperature, °C	
Mode	Load	Thermal Reactor	Oxidation Catalyst In	Oxidation Catalyst Out	Mode	RPM	Load	Thermal Reactor	Oxidation Catalyst
1	Idle	425	360	550	1	600	Idle	345	315
2	25%	575	420	500	2	1550	25%	565	290
3	55%	725	535	500	3	1550	10%	620	400
4	25%	695	535	540	4	600	Idle	540	400
5	10%	705	515	530	5	2000	55%	650	400
6	25%	685	520	525	6	3200	55%	845	650
7	90%	870	700	650	7	2000	90%	925	730
8	25%	40	600	665	8	2000	CT	205[c]	370[c]
9	CT	445[c]	425[c]	595[c]					
					Set-Up	1550	WOT	940[d]	-
Set-Up	WOT	935[d]	755[d]	725[d]	Set-Up	2000	WOT	980[d]	-
					Set-Up	3200	WOT	1020[d]	-
					Limit	-	-	1066	982

[a] During the second cycle of an emissions test

[b] No substantial temperature difference between catalyst inlet and outlet except at Idle and CT. Temperatures into catalyst at the end of the Idle and CT modes were approximately 205°C.

[c] Temperatures at CT were still decreasing at the end of the mode.

[d] At the end of two minutes of WOT operation

The temperatures attained in the thermal reactors and the oxidation catalyst, during the emissions cycle and the service accumulation schedule, remained well below the specified operating limits. Thermal reactor temperatures approached the operating limit only during the 3200 rpm wide-open throttle operation required for setting up the service accumulation schedule.

F. Maintenance During Service Accumulation

The general approach toward maintenance in this service accumulation demonstration was to schedule items which a manufacturer could reasonably be expected to specify. Primary exceptions to this were the oxidation catalyst and the EGR system, which were inspected more frequently than would normally be expected. The scheduled maintenance for the service accumulation demonstration is given in Table 19. This scheduled maintenance involved reasonably extensive inspection, while minimizing scheduled replacement of components. A summarized log describing the maintenance performed during service accumulation demonstration is given in Table 20.

Several component malfunctions and deteriorations, uncovered in the 1000 hour scheduled maintenance were found to have been a factor in the observed changes in the CO and NO_x emissions and the SFC. With reference to Table 20, at 1000 hours of service accumulation, replacement of the leaky diverter valve reduced the CO at the 90 percent of maximum power mode by about twenty percent. Changes in CO emissions due to cleaning of the two air injection tubes could not be definitely defined. However, there were no gross changes in CO emissions due to cleaning of the tubes. In checking the air injection system, the air pump was temporarily replaced with the air pump which had been used on the other engine during the optimization evaluations. With the replacement air pump, no gross changes in CO emissions were apparent. Since the air pump, which had been used for the 1000 hours, could not be proven to be defective, it was reinstalled on the engine.

Malfunction of the EGR system was found to be a primary factor affecting the emissions and fuel consumption. As described in Table 20, the orifice in the backpressure controlled system of the BPEGR valve had become partially plugged. Overall effectiveness of the 1000 hour tune-up and maintenance is illustrated in Table 15 by the emissions and SFC results for the pre- and post-maintenance emissions tests at 1000 hours.

TABLE 19. SCHEDULED MAINTENANCE

Item	Hours of Service Accumulation										
	125	250	375	500	625	750	875	1000	1125	1250	1375
Change Oil	X	X	X	X	X	X	X	X	X	X	X
Replace oil filter	X		X		X		X		X		X
Adjust idle speed	X			X				X			
Replace spark plugs - Gap to 1.52 mm				X				X			
Check spark plug wires				X				X			
Check ignition timing				X				X			
Adjust drive belts				X				X			
Tighten throttle body mounting bolts				X				X			
Replace air cleaner element				X				X			
Check PCV system				X				X			
Replace fuel filter				X				X			
Check air injection system				X				X			
Check EGR system - visual and manual				X				X		Y	
Visually check oxidation catalyst						Y	Y	Y	Y	Y	Y

X - scheduled at start of service accumulation
Y - scheduled after 750 hours of service accumulation

TABLE 20. DESCRIPTION OF SCHEDULED AND UNSCHEDULED MAINTENANCE PERFORMED

Service Accumulation Hours	Maintenance Performed
225	Repaired a loose electrical connection in the wiring to a solenoid which shuts off the EGR system at CT and idle.
500	Adjusted the limit switch in the above described system.
578	Increased engine idle speed.
639	Reinstalled original fuel filter - the replacement unit was found to adversely affect the operation of the fuel system.
	Replaced the fabricated sections of exhaust pipe adapting the thermal reactors to the exhaust elbow - the section on the right side of the engine had cracked.
750	Maximum power was down about 20 percent. After installing new spark plugs, normal power was restored.
	Due to a fire at an adjacent test stand, which was extinguished with a dry powder fire extinguisher, the air filter element was checked and replaced.
870	Adjusted engine idle speed in approximately the same amount but in opposite direction as required at 578 hours.
1000	Replaced the air pump diverter valve - at higher loads air leakage was observed through the diverter valve ports which normally exhaust air to the atmosphere for only a few seconds following a rapid increase in intake vacuum.
	Cleaned two air injection tubes (cylinder 3 and 4) which were plugged in a very limited area of the tubes to a diameter of about 3.2 mm (1/8"). The deposits were gray to black and very similar in appearance to deposits normally found within the combustion chamber. The other six air injection tubes had only a very thin, insignificant coating of deposits.

TABLE 20 (Cont'd.) DESCRIPTION OF SCHEDULED AND UNSCHEDULED MAINTENANCE PERFORMED

Service Accumulation Hours	Maintenance Performed
	The BPEGR valve was replaced due to a partially plugged orifice in the backpressure controlled system. The deposits, in this area and on the wire mesh screen filter within the valve, were black carbonaceous and somewhat oily in appearance.
1036	Repaired broken connector in plug wires to number 6 and number 7 cylinder.
1295	Replaced leaking vacuum line to fuel shutoff solenoid. This was preceded by adjustments to the fuel shutoff solenoid valve and the idle speed until the specific problem was located.
1420	Number 3 spark plug fouled out and was replaced.
1425	Number 2 spark plug fouled out during the night shift and was replaced. The other six plugs were replaced the next morning.
1500	Due to severe misfire, number 2 and number 3 spark plugs were replaced prior to determination of maximum power with the oxidation catalyst installed.

An item of concern was the relatively high rate of oil consumption being experienced in the engine. The rate of oil consumption reached approximately two liters per 24 hour period. No definite baseline rate of oil consumption could be established since there were no specific data available which was directly applicable to the service accumulation schedule used in this project. A rate of oil consumption of almost two liters per 24 hour period, however, is thought to be excessive. The oil added to the engine during each 125 hour period of service accumulation was as follows:

Service Accumulation Hours	Liters Added per Preceding 125 Hour Period	Operating Hours per Liter
125	3.5	36
250	5.0	25
375	6.0	21
500	5.5	23
000-500 Average	5.0	25
625	8.5	15
750	7.5	17
875	9.0	14
1000	9.0	14
500-1000 Average	8.5	15
1125	11.5[a]	11
1250	10.0	13
1375	9.5	13
1500	11.0[a]	11
1000-1500 Average	10.5	12

[a] Some leakage occurred during each of these periods.

These values in the table include oil required to bring the oil level to the full mark at the end of each 125 hour operating period.

Due primarily to the high oil consumption, a cylinder compression pressure check was conducted on the engine shortly after the tune-up at 1000 hours of operation. The results of this compression check were as shown in the table at the top of the next page.

Cylinder	Average Compression	Cylinder	Average Compression
1	135	2	155
3	133	4	153
5	155	6	153
7	133	8	158

Specification: 150±20

As shown, the compression in three out of the four cylinders on the left side of the engine was near the lower allowable specification limit.

Another item of concern was the spark plug fouling that began to occur after 500 hours of service accumulation. The spark plugs that were removed from the engine at 500 hours did not have any excessive or unusual deposits. At 750 hours, however, number 3 spark plug was misfiring and both number 2 and number 3 plugs had substantial deposits.

At 1000 hours, although no engine misfire was apparent, number 2 and number 3 plugs had very substantial deposits. At 1375 hours, some misfiring was apparent during the emissions tests. Around 1465 hours, number 2 and number 3 plugs were misfiring due to very substantial deposits. After the 1500 hour emissions test, number 2 and number 3 plugs were misfiring and had to be replaced prior to conductance of the emissions test with the oxidation catalyst installed.

It is of interest that several things occurred with the engine at some point after 500 hours of service accumulation.

(1) Maximum power was down about three percent at and after 625 hours relative to at and before 500 hours

(2) A substantial increase in oil consumption occurred after 500 hours

(3) Spark plug fouling began to occur after 500 hours

It appears that some significant change may have occurred in the engine at some point between 500 and 750 (probably between 500 and 625) hours of operation. The specific cause or causes for the change in maximum power, oil consumption and spark plug deposit rate after 500 hours of service accumulation are not known.

No maintenance or replacement was required with the oxidation catalyst during the 750 hours of service accumulation operation. After the

750 hours, no significant deterioration of the catalyst was visually apparent. Some minor catalyst plugging occurred, but the amount of plugging was not sufficient to result in any definite increase in exhaust backpressure or decrease in catalyst efficiency.

G. Post Service Accumulation Demonstration Emissions Results

Following completion of the service accumulation demonstration, two 23-mode experimental emissions tests were conducted with the service accumulation engine. One emissions test, using the proposed nine-mode cycle, was run prior to the 23-mode tests to assure no substantial change had occurred with the engine since completion of service accumulation. The results of this post-service accumulation emissions test are summarized and compared with previous tests as follows:

Test	Description	g/kW-hr HC	CO	NO_x	$HC+NO_x$	kg/kW-hr SFC
23	Post-Service Accumulation	0.42	14.44	3.94	4.37	0.395
21	1500 Hours of S. A.	0.36	14.43	3.53	3.89	0.390
263 + 265	Pre-Service Accumulation	0.38	10.02	4.45	4.83	0.395
211 & 212	Baseline	5.7	33.6	12.1	17.8	0.450

The results of the post-service accumulation emissions test, as compared with the results of the 1500 hours emissions test, indicate no substantial change in engine operation. This is primarily evident by plotting these data points onto the previous Figure 11; which graphically shows the results of each 125 hour emissions test during service accumulation.

The averaged results of the 23-mode tests are summarized and compared with previous tests as follows:

Test	Description	g/kW-hr HC	CO	NO_x	$HC+NO_x$	kg/kW-hr SFC
24	Post-Service Accumulation	0.60	21.01	4.69	5.29	0.388
264	Pre-Service Accumulation	0.31	5.91	6.81	7.12	0.393
209	Baseline	10.6	48.9	12.1	22.7	0.429

As shown, the post-service accumulation 23-mode test, relative to the pre-service accumulation 23-mode test, had significantly higher CO and significantly lower NO_x. Although the HC emissions increased significantly on a percentage basis, the absolute value remained low. The increase in CO in the post-service accumulation 23-mode emissions tests was primarily due to significantly increased CO emissions rates in some of the mid- and high-load modes.

There was also some increase in the post-service accumulation proposed emissions procedure test results (Test 23) relative to the pre-service accumulation results (Tests 263 + 265). That increase, however, was considerably less than the increase experienced in the 23-mode tests. It is interesting to note that the ratios of post-service accumulation CO emissions to baseline CO emissions, for the proposed nine-mode emissions procedure and the 23-mode procedure, were essentially the same with ratios of 0.43.

It should also be noted that there was a significant increase in the CO emissions during WOT operation at an engine speed of 2000 revolutions per minute (rpm). The post-service accumulation CO emission rate at WOT was approximately three times greater than the rate in pre-service accumulation determinations (1.47 percent CO in the post-service accumulation WOT as compared with an average of 0.40 percent CO for the pre-service accumulation WOT evaluations in Tests 261, 262, and 263).

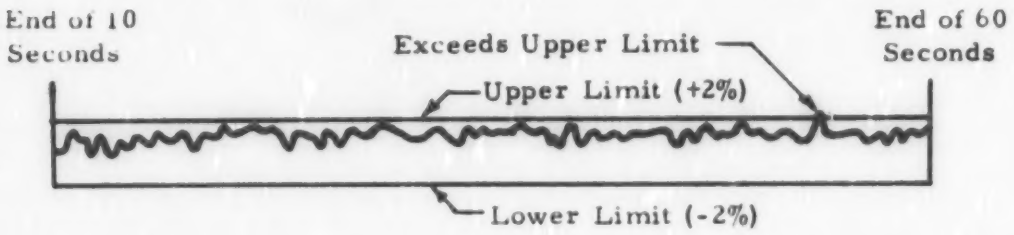
H. Discussion of the Procedure Relative to This Project

The intent of this project was to utilize the Recommended Procedure[15], without this project becoming a test case for the new procedure. Therefore, the requirements in the recommended procedure were complied with in this project to the extent deemed practical. The major deviation from the recommended procedure was that intake air flow rate was not determined in this project. Therefore, the current method for determining the wet to dry correction factor for HC concentration was used and comparison of the measured and calculated fuel to air ratio could not be made. It should be noted that when air injection into the exhaust is used, the measured air flow required for fuel/air ratio comparison purposes in the recommended procedure is the summation of the intake air and the air injected into the exhaust.

Difficulties encountered in utilizing the recommended procedure in this project were examined to a reasonable extent and reported in the progress reports and in this final report. Such difficulties were resolved when their resolution was within the scope of this project.

One area in which difficulties were encountered was remaining within the modal torque limits. The limits for each power mode are ± 2 percent of maximum determined torque during the last 50 seconds of each 1 minute mode. The primary problem mode is the 25 percent of maximum power mode that immediately follows the idle mode. It has been very difficult to obtain stabilization within the first 10 seconds and to maintain

stabilization throughout the remainder of this mode. In the other power modes, the torque generally remained within the specified limits, with only a few minor exceptions. A reasonably typical torque trace illustrating the few modes in which the torque exceeded the limits, other than the 25 percent power mode following idle, is illustrated as follows:



There are several potentially applicable methods that could be applied to the dynamometer, control and operating systems being utilized in this project. These include: additional inertia, suppression of the torque output oscillations, and closer control by the operator. The method applied in this project was attempting closer control by the operator. Significant improvement was achieved and strict compliance with these torque limits, although relatively difficult, appears to be potentially achievable. In keeping with the objectives of this project, minor excursions of the torque trace outside the limits was not by itself cause for rejecting a test.

Another area in which full compliance with the procedure was not attained is the sample system HC hang-up limit. The requirement is that within 50 seconds of introducing HC zero-grade gas into the sample probe, following an emissions test, the hang-up must not be greater than 5 percent of full scale on the lowest range used during the test. With the engine configuration being evaluated, this results in a required HC hang-up limit of 5 ppm or less. (In some tests, a range below 100 ppm full scale would have been required to maintain recorded values above the specified 20 percent of full scale during the test. A range of 100 ppm full scale was the lowest practical useable range on the hydrocarbon instrument used in this project.) The HC hang-up significantly exceeded this requirement; except for those tests with the oxidation catalyst installed.

As a system check, the entire sampling system was cleaned with a solvent. Following this cleaning, there was no residual hang-up in the sampling system. After sampling emissions during a low HC producing power mode, the HC hang-up at 50 seconds was 3 ppm. After sampling emissions during idle, the HC hang-up was 11 ppm. After sampling emissions during CT, the HC hang-up was as high as 50 ppm. It appears that a HC hang-up limit of 5 percent of full scale on the lowest range used may be a very stringent requirement for engines having very low HC emissions during some or many but not all of the modes.

In the proposed rules, the percentage of total cycle time specified for cut-throttle operation in the service accumulation schedule was more than double the weighting factor (in percent) for CT in the emissions cycle. It should be noted that should the weighting factors in the emission cycle be subsequently changed to agree with the equivalent factors in the proposed service accumulation schedule, some changes in engine optimization may become applicable. However, since the optimized system utilized in this project utilized fuel shutoff at CT, any such increase in the CT weighting factor should result in improved composite specific fuel consumption with this optimized engine system.

V. DRIVEABILITY DEMONSTRATION

Following completion of the service accumulation demonstration, a decision was reached to conduct a demonstration of vehicle driveability with the 1500 hour durability engine. Due to the limited remaining contract funds, no overhaul of the engine or additional optimization, directed toward driveability, could be performed.

At the conclusion of 1500 hours of service accumulation, the engine was using a substantial amount of oil and the maximum power was lower than at the start of service accumulation. Deterioration of some control systems was becoming apparent, based on the post service accumulation emission test results. It should also be recalled that all engine optimization had been conducted under steady state operation on a stationary dynamometer. Primary optimization emphasis was given to those modes of the proposed nine-mode emissions test procedure[15]. Accordingly, the primary purpose of this on-the-road evaluation was to determine whether the durability engine was driveable in a truck.

A. Driveability and Performance Test Procedures

The test procedures selected for use in this evaluation had been initially developed and used in previous EPA contracts.[4, 10] The on-the-road evaluations consisted of four major procedures.

The first was a cold start driveaway around a stop-and-go type moderate speed closed course. The second was a warm driveability rating of the vehicle's quality of operation after being fully warmed up. The third procedure involved acceleration and grade performance to assess the vehicle's performance under loaded, real driving type situations. These three procedures are described in Appendix H-1. They were developed and revised with the advice and consent of the EPA Project Officer and were initially approved for use in May of 1973. In general, they utilize the then available methods in use by the leading truck manufacturers for this purpose and utilize rating definitions that are appropriate to all motor vehicles; though most widely utilized with passenger cars.

The fourth procedure involved measuring fuel consumption over the San Antonio Road Route (SARR). The SARR is a test course laid-out within the city limits of San Antonio which contains traffic conditions ranging from downtown stop-and-go to semi-congested freeway operation. The SARR is illustrated in Appendix H-2.

B. Vehicle Acquisition and Instrumentation

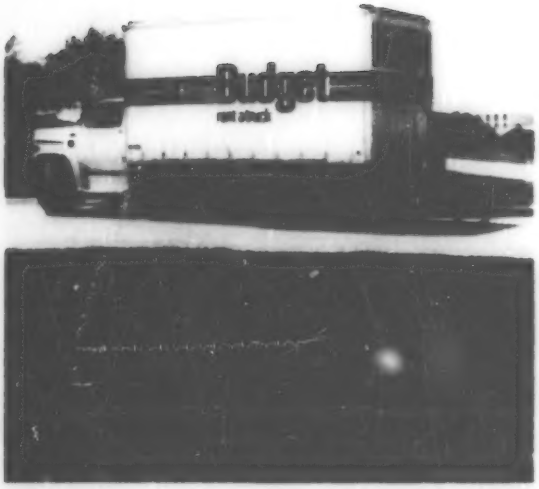
After considerable searching, an appropriate truck was located which was powered by a 350 Chevrolet engine and met the GVW requirements of this evaluation. The truck was a 1976 Chevrolet Model C-60 Van with a Model 113-350 engine which had been certified for 1975 federal emission standards. The Chevrolet truck, engine, and transmission are described as follows:

	Truck	Engine	Transmission
Make	Chevrolet	Chevrolet	New Process Gear
Model	C-60	113-350	542
Iden. or Ser. No.	CCE626V107990	V0930TMX	-
Model Year	1976	1975	-
Style or Type	Van (4.9 metre)	V-8	5 Speed
Source	Budget 16001		
Usage	Rental		
Odometer, km	34 044		
GVW, kg	9072		
Empty Wt., kg	4468		
Axle Ratio	Single Speed		
Tire Size	9.00-20		

The condition of the engine and exhaust system and the operation of the truck as received were exceptionally good. Although the ignition timing and idle speed were within normally acceptable limits (3° BTDC and 550 RPM as received), they were adjusted to be as near the specified values of 4° BTDC and 600 rpm as possible. No maintenance or new parts were required.

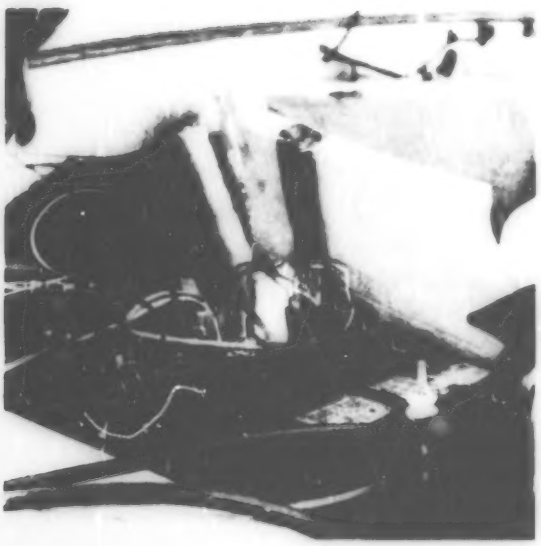
In order to obtain a condition more conducive to demonstrate driveability problems, the truck was loaded to one-half payload based on the maximum GVW allowed in a C-60 truck van. Therefore, for these evaluations the truck was loaded to a test weight of 7800 kg (17,200 lbs).

Several views of the truck and the installation of the durability engine in the truck are shown in Figure 13. Since a suitable access hole was not available into the cab from the engine compartment, the electronic fuel control for the fuel injection system was mounted in the engine compartment behind the battery. Insulation was mounted in the engine compartment and the hood was propped open a couple of inches to deflect



Truck Prepared for Road Evaluations

Hood Propped Open with Durability Engine for Temperature Control of Electronic Control Unit



Underhood Mounting of Electronic Fuel Control

Durability Engine Installed in the Truck

Figure 13. Views of the truck and the durability engine installed in the truck.

engine heat and direct outside air to the electronic fuel control and the engine intake air inlet. This served to maintain the temperature of the electronic fuel control within acceptable limits. Engine intake air temperature, although reasonably stabilized in this manner, remained significantly above ambient; primarily in city stop-and-go operation such as in the SARR.

The operations to determine cold start driveaway, warm driveability and performance required instruments and equipment to measure road speed, distance, engine speed, intake manifold vacuum, intake air temperature and elapsed time. A Labeco 5th wheel provided the speed and distance signals for read-out in the cab of the truck.

In addition to evaluating driveability, a determination was made of the fuel consumed during operation over the driveability course and the SARR. The fuel consumed was determined by the weight loss, from a five-gallon fuel supply can, after operation over the road course. The weigh scale used was graduated in intervals of 5 grams and was capable of measuring to an accuracy of 5 grams (0.01 lbs).

C. Test Results

The initial on-the-road evaluations were conducted with the truck as received, except for the minor tune-up performed on the engine. Following the completion of these evaluations, the original engine was removed, the 1500 hour durability engine was installed and the on-the-road evaluations were repeated.

All accelerations from rest were with the transmission in 2nd gear. First gear is designed for full load steep grade situations and is rarely used in level road operation. Weather conditions were somewhat unstable throughout the test period. With effort, however, it was generally possible to schedule the tests around the periods of major atmospheric variation.

There was no known way, within the scope of this driveability evaluation, to assure that the truck with the engine as-received was typical of all trucks of that same configuration. Data generated in this evaluation appeared to indicate that the as-received truck-engine combination was better than average. The exceptionally good driveability and performance of the truck as-received and the known deteriorated condition of the 1500 hour durability engine preclude direct comparisons of the test results. Therefore, the results with the truck as-received and the results with the durability engine installed in the truck will be discussed separately.

1. Truck As-Received

The truck had 34,044 km (21,154 miles) on the odometer as-received. Its overall condition was judged to be very good. Operation

and performance of this truck was found to be outstanding, based on experience with other trucks in several previous projects. Results of the evaluations conducted are discussed separately as follows.

a. Cold Start Driveaway

Three tests were conducted; each with a minimum overnight soak of 16 hours at a soak temperature between 70-78° F. The manual choke was used in accordance with manufacturer's recommendations. Cranking times to initial start ranged from 1.0 to 1.5 seconds. In one of the three tests the engine died immediately following initial start but readily restarted on the second attempt. During all three tests, idle was somewhat rough for several seconds following initial start. In all cases, idle was smooth and was judged satisfactory following clearing of the engine (by depressing and immediately releasing the throttle) 20 seconds after initial start.

The road operation, procedure is described on pages H-2 through H-6 in Appendix H-1, consisted of part-throttle (PT) accelerations and decelerations, wide-open throttle (WOT) acceleration, steady speed operation, full cut-throttle (CT) and idle. Maximum speeds were raised to 64 km/hr (40 mph). During accelerations, rated maximum speed of the engine was generally approached before upshifting to the next gear.

The entire operation on the road was uneventful in that there were no stalls or discernable hesitation, stumble, stretchiness, surging, detonation or backfires at any time. Satisfactory marks were given throughout the cold start and driveaway evaluation; except for the previously discussed initial start.

b. Warm Driveability

With the vehicle thoroughly warmed up, a series of manifold vacuum readings were taken both ways over a level road course. The results were as follows:

Speed		Engine	Trans.	Manifold Vacuum	
km/hr	mph	RPM	Gear	mm Hg	inches Hg
32	20	2800	3	460	18.1
48	30	2650	4	452	17.8
64	40	2500	5	343	13.5
80	50	3100	5	300	11.8

These manifold vacuums are among the highest experienced at equivalent vehicle speeds in previous projects.

The warm driveability procedure, described on pages H-7 through H-9 in Appendix H-1, included a number of PT and WOT accelerations and PT and CT decelerations. At no time did the engine stall, surge or otherwise operate unsatisfactorily during any of these accelerations or decelerations. Tip-in response was essentially instantaneous; being considerably less than one-half second.

After several WOT accelerations, the engine was allowed to idle 30 seconds and then was shut-off. The engine idled smoothly near 600 rpm and no after-run was noted following engine ignition shut-off. After the 15 minute soak period, the engine restarted easily and idled satisfactorily near 550 rpm. The engine was then shut-off again and no after-run was noted.

In summary of the warm driveability phase of the testing, the engine operated satisfactorily in all respects. The engine manifold vacuums during steady state operation appeared to be on the high side relative to the range of vacuums experienced previously.

c. Vehicle Performance and Highway Operation

The third portion of the driveability series involved acceleration performance and highway operation. Average times and distances required to perform the designated accelerations and decelerations were as follows:

	Acceleration or Deceleration, km				
	0-32	0-64	0-88	32-80	80-32
Time, seconds	8.8	22.7	49.2	30.7	42.7
Distance, km	0.047	0.249	0.816	0.523	0.639
Distance, miles	0.029	0.155	0.507	0.325	0.397
Gear	2-3	2-4	2-5	4-6	5

Based on previous experience, these accelerations could be considered as being exceptionally good. Acceptable driving quality was noted for all these acceleration and deceleration operations. There was never any discernible surge, stretchiness, ping or other combustion noise, backfires (deceleration), or any other undesirable characteristics.

The gradeability test was conducted on a portion of expressway which is essentially level for about 1.2 km followed by a relatively steep grade for about 0.4 km. The average results of this test were as follows:

	Speed, km/hr			Time Required,
Distance, km	Start	Maximum	Ending	Seconds,
1.627	0	91.5	75.5	82.7

The replicate determinations repeated nicely with satisfactory driving qualities.

The truck was then operated at relatively constant speed operation of 72.5 and 88.5 km/hr (45 and 55 mph) and general driveability characteristics were observed. The section of interstate highway, used for the highway speed evaluations, contained various grades as the highway crossed over and under other roads and highways. The manifold vacuum required to maintain a relatively steady road speed ranged from 150 to 400 mm of mercury at 72.5 km/hr and 100 to 375 mm at 88.5 km/hr. The only potentially undesirable characteristic noted during highway operation was a noise condition which occurred occasionally at a speed between 80 and 88 km/hr. The source of the noise was not definitely located. This observed momentary noise, however, was probably no more severe than has been the highway speed continuous noise observed in some of the trucks evaluated in past projects.

The major conclusion from these tests was that the vehicle-engine combination performed satisfactorily in all respects. Compared to trucks tested in other projects, the performance during acceleration and grade type tests appeared to be exceptionally good.

d. San Antonio Road Route (SARR)

The truck was then operated over the SARR (route is illustrated in Appendix H-2). The SARR involves traffic conditions ranging from downtown stop-and-go to semi-congested freeway operation. As in the other evaluations conducted, no driveability or performance problems were noted.

e. Fuel Consumption

The fuel consumed was measured for the cold start and drive-away evaluation (CS&D) and the San Antonio Road Route (SARR). Results of these fuel consumption evaluations were as follows:

Evaluation	No. of Runs	Distance, km	Avg. Speed, km/hr	Fuel Cons., 1/100 km		Average Miles per Gallon
				Avg.	S. D.	
CS&D	3	11.00	34.5	51.9	1.3	4.53
SARR	9	11.62	33.3	36.9	0.9	6.38
SARR[a]	3	11.62	36.0	37.9	0.9	6.22

[a]Three run repeat after the as-received engine was reinstalled into the truck.

A fairly significant amount of data from previous projects are available for comparison with the results for the SARR evaluations. Based on data presented in the final report for EPA contract 68-03-0441[12], the fuel consumption for this truck appeared to be low compared with equivalent trucks evaluated in the past projects. The mean value reported for trucks at 7800 kg test weight in past projects was approximately 42.7 l/100 km, as compared with 36.9 for this truck. In the three-run repeat of the SARR, after the as-received engine was reinstalled, the average speed increased over two km/hr due to improved traffic conditions. The fuel consumption repeated reasonably well; with an increase of less than three percent, 37.9 versus 36.9 litres/100 km. This repeat was conducted to assure the validity of the initial values.

2. Truck with Durability Engine Installed

The original engine was then removed from the truck and the 1500 hour durability engine was installed. After installation and minor tune-up, the entire series of driveability and performance evaluations were conducted. The operation and performance of the truck-engine combination was generally judged to be satisfactory, except in a few areas of operation. A number of engine systems maintenance problems were experienced during these evaluations. The results of these evaluations are discussed separately as follows:

a. Cold Start Driveaway

Three tests were conducted; each with a minimum overnight soak of 16 hours at a soak temperature between 70-78°F. Cranking times to initial start in the three evaluations were 2, 3 and 7 seconds. In the evaluation with the 2 second initial start, the engine died but readily restarted within 1 second on the second attempt.

High speed idle was generally satisfactory immediately following the initial start and throughout the idle operation. In one of the three evaluations, a near stall occurred immediately following the engine clear operation. The engine clear consisted of a depression and immediate release of the throttle.

During the road operation (procedure is described on pages H-2 through H-6 in Appendix H-1), the driveability was generally acceptable, with a couple of apparently related exceptions. As with the as-received engine, the maximum speeds were raised to 64 km/hr (40 mph). During accelerations, rated maximum speed of the basic engine was generally approached before upshifting to the next gear.

The undesirable operating characteristics occurred during initial acceleration from engine idle speed and upon reapplication of the

throttle following a gear shift during WOT-fast-shift operation. In the initial acceleration from engine idle speed, a moderate to heavy hesitation generally occurred. During WOT-fast-shift operation, a backfire would often result.

No specific problems or undesirable characteristics were noted during the part-throttle accelerations or the part-throttle and full cut-throttle decelerations. The observed undesirable operating characteristics should be resolvable in a system receiving sufficient optimization toward driveability. Such specific driveability related development was beyond the scope of this project.

b. Warm Driveability

With the vehicle thoroughly warmed up, a series of manifold vacuum readings were taken over a level road course. The results were as follows:

Speed		Engine	Trans.	Manifold Vacuum	
km/hr	mph	RPM	Gear	mm Hg	inches Hg
32	20	2800	3	376	14.8
48	30	2650	4	353	13.9
64	40	2500	5	224	8.8
80	50	3100	5	157	6.2

These manifold vacuums reflect the relatively high EGR rates and are generally within the range of manifold vacuums obtained in a previous emissions control technology project with EGR equipped engines.(10)

The warm driveability procedure, described on pages H-7 through H-9 in Appendix H-1, includes a number of PT and WOT accelerations and PT and CT decelerations of the vehicle in motion. At no time did the engine stall, surge or otherwise operate unsatisfactorily during any of these accelerations or decelerations. Tip-in response was essentially instantaneous, being less than one-half second.

Following several WOT accelerations, the engine was allowed to idle 30 seconds and then was shut off. The engine idled smoothly near 600 rpm and there was no after-run following shut-off of the engine ignition. After the 15 minute soak period, the engine readily restarted and idled satisfactorily between 550 and 600 rpm. No after-run was noted upon shut-off of the engine following a 30 second idle.

In summary of the warm driveability phase of the testing, the engine operated satisfactorily throughout all operating conditions specified.

c. Vehicle Performance and Highway Operation

The third portion of the driveability series involved acceleration performance and highway operation. Average times and distances required to perform the designated accelerations and decelerations were as follows:

	Acceleration or Deceleration, km				
	0-32	0-64	0-88	32-80	80-32
Time, seconds	9.1	24.7	57.7	36.3	34.2
Distance, km	0.051	0.280	0.981	0.631	0.508
Distance, miles	0.032	0.174	0.610	0.392	0.316
Gear	2-3	2-4	2-5	4-5	5

Acceleration times were somewhat longer than those obtained with the truck as-received. These times, however, were within the range of acceleration times obtained on trucks evaluated in the emissions control technology project.[10] With the exception of the previously discussed hesitation during initial acceleration and the occasional backfire following a WOT-rapid-shift acceleration, acceptable quality was noted for these acceleration and deceleration operations. There was no discernible surge, stretchiness, ping or related combustion noise, or other undesirable characteristics.

The gradeability test was conducted on the portion of expressway which is essentially level for about 1.2 km followed by a relatively steep grade for about 0.4 km. This was the same stretch of highway used with the as-received truck. The average results for this test were as follows:

Total Distance, km	Speed, km/hr			Time Required, Seconds
	Start	Maximum	Ending	
1.628	0	90.0	72.5	85.7

The replicate determinations repeated within one second and driving qualities were satisfactory.

The truck was then operated at relatively constant speed operation of 72.5 and 88.5 km/hr (45 and 55 mph) and general driveability characteristics were observed. The section of interstate highway utilized was identical to that used in similar evaluations with the as-received truck.

The manifold vacuum, required to maintain a relatively steady road speed, ranged from 100 to 375 mm of mercury at 72.5 km/hr and 75 to 300 mm at 88.5 km/hr. There were no undesirable characteristics noted in this highway operation, except for the noise which occurred momentarily at a speed between 80 and 88 km/hr. This noise was the same type observed from the as-received engine.

In these tests the durability engine generally performed satisfactorily. The performance during acceleration and grade type tests was not quite as good as was obtained with the as-received truck-engine combination but appeared to be within the range of values obtained on trucks in previous projects.

d. San Antonio Road Route (SARR)

The truck with the durability engine installed was then operated over the SARR route illustrated in Appendix H-2. Except for the two undesirable driving characteristics noted and discussed in the previous section on cold start driveaway, no other driveability or performance problems were noted. During the three runs over the SARR, when driveability was specifically evaluated, there were a total of 10 backfires (two in one run and four each in the other two runs). Nine of these ten backfires were barely discernible and would have generally only been noticeable to someone specifically listening for backfires. One of the ten backfires was more severe and judged to have been obvious to any observer.

e. Fuel Consumption

The fuel consumed was measured for the cold start and driveaway evaluation (CS&D) and the San Antonio road route (SARR). Results of these fuel consumption evaluations were as follows:

Evaluation	No. of Runs	Distance, km	Avg. Speed, km/hr	Fuel Cons., 1/100 km		Average Miles per Gallon
				Avg.	S. D.	
CS&D	3	11.00	34.6	53.7	1.2	4.38
SARR	8	11.63	36.0	41.6	0.9	5.65

Fuel consumptions for the CS&D and the SARR with the durability engine were higher than with the as-received engine. For the CS&D the increase was between three and four percent, whereas for the SARR, the increase was 10 to 13 percent. The fuel consumption results for the durability engine on the SARR, however, were two to three percent lower than the mean value reported for trucks at 7800 kg test weight in past projects (41.6 1/100 km compared with 42.7 1/100 km).[12]

3. Discussion of the Driveability and Performance Results

As previously discussed, the durability engine was optimized over stationary dynamometer steady-state procedures with primary emphasis on the proposed nine-mode emissions procedure. Primary attention was given to meeting the target reductions in exhaust emissions and fuel consumption relative to the standard unmodified engine and to the assembly of a system that would withstand the 1500 hour durability test. Although driveability characteristics with the modified engine were considered and evaluated to the extent practical on the stationary engine dynamometer, specific optimization for driveability was not included as a part of this project. Total stationary dynamometer operating hours on the durability engine approached 2000 at the time of the vehicle driveability evaluation and the engine was judged as being in need of an overhaul.

This driveability evaluation was conducted to determine whether the durability engine, if installed in an appropriate truck application, would result in a vehicle with acceptable driveability. This rather cursory evaluation determined that driveability and performance with the durability engine were generally satisfactory. With the two exceptions discussed in the results section, the driveability would be considered acceptable to most drivers. The vehicle evaluation, particularly fuel consumption results, require further discussion.

The original intent of the road evaluation was to determine vehicle driveability and the experimental design was sufficient to this end and was cost effective. With the subsequent addition of fuel economy measurements, however, back-to-back tests should have been conducted with the engine in the emissions modified configuration, as it completed the 1500 durability test, and then in its original configuration. Using the same basic engine for these evaluations would have shown whether road fuel economy was improved by the modified engine, as was achieved in the laboratory following the prescribed nine-mode steady state procedure. Thus, it is not possible to draw direct conclusions from the fuel economy testing.

The as-received truck fuel economy values were better than in previous experience with earlier model year vehicles as mentioned previously. Figure 14, which is reproduced from a previous final report,[12] illustrates the relationship between vehicle test weight and fuel economy over the SARR. The as-received truck fuel economy is shown on this graph for comparison. There is no simple or obvious explanation for this apparent anomaly. On the other hand, the modified durability engine powered truck gave results on the order of three percent better than the mean for all trucks, as shown by the data point indicated "durability engine" on Figure 14. This comparison may be more appropriate than durability engine to as-received engine, though neither comparison is technically satisfactory.

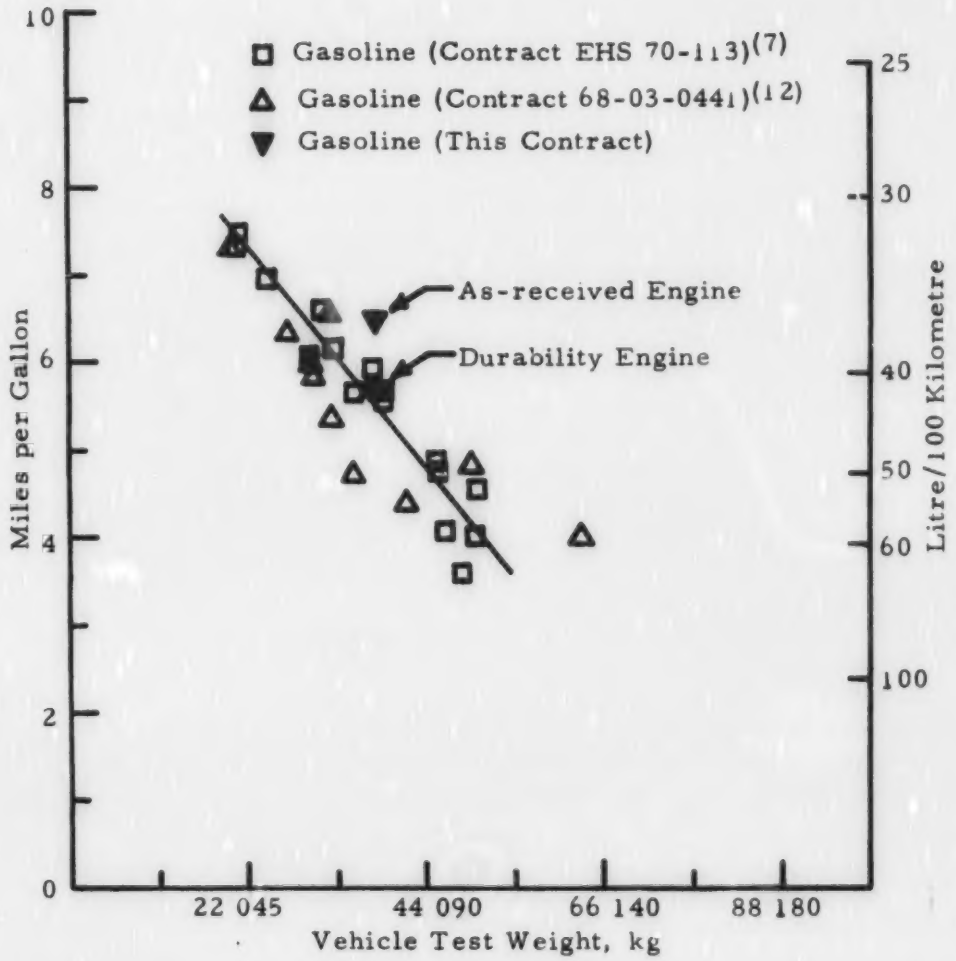


Figure 14. Fuel economy as a function of vehicle test weight on the San Antonio Road Route.

It is not surprising that the fuel economy during transient operation was no better, relative to the mean of the trucks on Figure 14, in light of the known inability of the modal steady state test to predict vehicle fuel economy. In the summary on page vii of the final report from Phase I of this project,[16] it was concluded that:

> "Changes in 9-mode FTP fuel rate and emissions from precontrolled to 1970 and 1974 levels of control were found not to correlate with changes in dynamometer driving cycle fuel rate and emissions from precontrolled to 1970 and 1974 levels of control."

It is not known, but is likely, that this same lack of correlation can be applied to the fuel consumption relationships associated with the proposed nine-mode procedure and the SARR. The range of engine speeds encountered in road evaluations and the transient behavior of the engine are not represented during these engine dynamometer tests.

In summary, the road evaluation demonstrated generally satisfactory driveability and performance of the vehicle powered by the modified durability engine. The driveability, performance and fuel consumption of this engine were not as good as were determined for the engine that was in the truck as received. The truck as received, however, exhibited superior driveability, performance and fuel consumption to similar earlier model year trucks evaluated in previous projects. Lack of direct, "back-to-back" fuel economy measurements with the specific test engine in modified and unmodified configurations has precluded technically sound comparisons. The modified durability engine did exhibit on the order of three percent improvement in fuel economy relative to a group of similarly tested trucks. In conclusion, the driveability and general performance of the truck powered by the modified engine were quite encouraging.

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10. Urban, Charles M. and Karl J. Springer, "Emissions Control Technology Assessment of Heavy Duty Vehicle Engines," Final Report No. EPA-460/3-74-007 to the Environmental Protection Agency under Contract 68-03-0472, December 1973.

11. Ingalls, M. N. and K. J. Springer, "Mass Emissions from Diesel Trucks Operated Over a Road Course," Final Report No. EPA-460/3-74-017 to the Environmental Protection Agency under Contract 68-01-2113, August 1974.

12. Ingalls, M. N. and K. J. Springer, "Mass Emissions from Ten Pre-Controlled Gasoline Trucks, and Comparisons Between Different Trucks on a Road Course," Final Report No. EPA-460/3-75-004 to the Environmental Protection Agency under Contract 68-03-0441, April 1975.

13. Urban, Charles M. and Karl J. Springer, "Study of Emissions from Heavy Duty Vehicles," Final Report No. EPA-460/3-76-012 to the Environmental Protection Agency under Contract 68-03-2147, May 1976.

14. Environmental Protection Agency, "Recommended Heavy Duty Gasoline Instrumentation and Test Procedures, July 11, 1975. (This procedure, with some modifications, was included in the proposed rules in Reference 15).

15. Federal Register, Vol. 41, No. 101, Environmental Protection Agency, "Proposed Rules for Heavy Duty Engines," May 24, 1976.

16. Ingalls, Melvin N. and Robert L. Mason, "Heavy-Duty Fuel Economy Program - Phase I, Specific Analysis of Certain Existing Data," Final Report No. EPA-460/3-77-001 to the Environmental Protection Agency under Contract 68-03-2220, January 1977.

17. Federal Register, Vol. 37, No. 221, Environmental Protection Agency, "Rules and Regulations for New Motor Vehicles and New Motor Vehicle Engines", November 1972, with subsequent amendments.

18. Letter John J. McFadden to Karl J. Springer dated February 17, 1972, with attachment titled "Test Procedure for Heavy Duty Motor Vehicle Engines" dated February 17, 1972. (This attachment was included as Appendix Y in Reference 6).

APPENDICES

A - General Information
B - Baseline Results
C - Standard Carburetor Results
D - Dresserator Inductor Results
E - Electronic Fuel Injection Results
F - System Assembly for Service Accumulation Demonstration
G - Service Accumulation Demonstration Results
H - Driveability and Performance Procedures

APPENDIX A

GENERAL INFORMATION

A-1 Description of Engines and Components
A-2 Test Nomenclature
A-3 Explanation of Nine-Mode FTP Computer Printout Sheets
A-4 Explanation of Nine-Mode EPA Computer Printout Sheets
A-5 Explanation of Experimental 23-Mode Computer Printout Sheets
A-6 Ignition Timing at 2000 rpm

TABLE A-1. DESCRIPTION OF ENGINES AND COMPONENTS

Baseline Components	Part Number	Make or Model No.	Description or Serial No. Cell 1	Cell 2
Engine	343678	C-60	V1210TMX	V0827TMX
Carburetor[a]	7044134	Rochester	N6607	N6606
Distributor[b]	1111364	Delco Remy	4L5	4H12
Air Cleaner[c]	698364	-----	-----	-----
Alternator	1100543	-----	-----	-----
Starter	1108362	-----	-----	-----
Spark Plugs	6470779	R-44T	-----	-----
Plug Wires	8912437	-----	-----	-----
Optimization Components				
Electronic Fuel Injection	ECU-1607250	Bendix	Similar to 1975 Cadillac Sys.	
Dresserator Inductor[d]	-----	Dresser	-----	-----
Thermal Reactors[d]	-----	GM	-----	-----
Int. Man. with EGR Porting	345755	-----	-----	-----
Back Pressure EGR Valves	-----	MX-4809	1222 & 1223	-----
Exhaust Manifold with Air Injection Porting	346222	-----	-----	-----
Exhaust Manifold with Air Injection Porting	346710	-----	-----	-----
Air Pump[d]	L-73641	Saginaw	254863V & 254293V	
Air Injection Tube Assembly	355972	-----	-----	-----
Air Injection Tube Assembly	355973	-----	-----	-----
Diverter Valve	7029295	-----	-----	-----
HEI Distributor	1112880	-----	-----	-----
Spark Plugs	-----	R44TX	-----	-----
HEI Plug Wires	8908551	-----	-----	-----

[a] 2-Barrel (The initial carburetors received were 7043424)
[b] Has centrifugal but does not have vacuum advance
[c] Substitute unit for unavailable model specified
[d] Experimental Units

TABLE A-2. TEST NOMENCLATURE

Initial Carburetors - Carburetors received with engines, which were subsequently found to be 1974 rather than 1975 model carburetors.

Carburetors 6606 and 6607 - Carburetors received from General Motors since 1975 model carburetors were not available through local dealers.

Test No. - 100 series are Engine number 1 and 200 series are Engine Number 2.

Run - Sequential evaluations in a specific test. An X designates a simulated test constructed out of modal data.

Type Test - 9-FTP -- Current Heavy Duty Gasoline Certification Procedure (17) with instrumentation modification

9-EPA -- Recommended nine-mode procedure dated July 11, 1975.[14] Modes are based on percent of maximum torque

23-Mode -- Modal experimental procedure[18] which is somewhat similar to the 13-mode diesel certification procedure

SS -- Individual Steady State Evaluations

WOT -- Wide Open Throttle Evaluation at 2000 rpm

Description: AI - Manifold Air Injection

BL - Baseline

BPEGR - Back Pressure EGR valve (i.e., EGR flow is modulated by the exhaust back pressure). Numbers are given to designate orifice and spring used.

CARB - Carburetor

CT - Cut Throttle

DECEL - Throttle held to some equivalent no load rpm above idle speed during the cut throttle mode

DI - Dresserator Inductor
BA - Bleed Air Valve Setting
ROD - Fuel Rod Setting

TABLE A-2 (Cont'd.) TEST NOMENCLATURE

EFI - Bendix Electronic Fuel Injection System
ECU - Electronic Control Unit (number given designates the setting on the potentiometer which controls fuel flow)

EGR - Exhaust Gas Recirculation

HEI - High Energy Ignition System

IA - With Manual Ignition Advance

MEGR - manually operated EGR

NOAI - no air injection

NOVA - no vacuum advance

NLRPM - number preceding is the equivalent no-load rpm at which the throttle was held open during the CT mode

PL - Heads with stainless steel liners installed in the exhaust ports

Standard Timing - 14° BTDC at 2000 rpm

TR - Thermal Reactors

WAI & W/AIR - with air injection

W/O Air - without air injection

WVA & W/VA - with distributor vacuum advance

XCT - except at cut throttle

XM1&9 - except modes 1 and 9

TABLE A-3. EXPLANATION OF NINE-MODE FTP[17]
COMPUTER PRINTOUT SHEETS

COLUMN EXPLANATION

Column	Column Title	Explanation
1	MODE	Mode number and manifold vacuum
2	AS MEASURED HC-FID	Measured hydrocarbon emissions, ppmC
3	AS MEASURED CO	Measured carbon monoxide emissions in percent
4	AS MEASURED CO_2	Measured carbon dioxide emissions in percent
5	AS MEASURED NO_x-CL	Measured oxides of nitrogens emissions in ppm NO_x
6	TOTAL CARBON	The percentage of exhaust gas that is carbon containing gas
7	FUEL G/HR	Engine fuel consumption in Grams/Hr
8	CALCULATED G/HR HC	Hydrocarbon emissions in Grams/Hr. calculated from measured HC (HC by FID corrected to a dry gas basis)
9	CALCULATED G/HR CO	Carbon monoxide emissions in Grams/Hr. calculated from measured CO
10	CALCULATED G/HR NO_x	Oxides of nitrogen emissions in Grams/Hr. calculated as NO_2 from measured NO_x
11	WT. FACT.	Weighting factor for each mode
12	WEIGHTED G/HR HC-FIC	Hydrocarbon emissions in Grams/Hr. times the weighting factor
13	WEIGHTED G/HR CO	Carbon monoxide emissions in Grams/Hr. times the weighting factor
14	WEIGHTED G/HR NO_x-CL	Oxides of nitrogen emissions as NO_2 Grams/Hr. times the weighting factor

TABLE A-3 (Cont'd). EXPLANATION OF NINE-MODE FTP[17] COMPUTER PRINTOUT SHEETS

COLUMN EXPLANATION

Column	Column Title	Explanation
15	KW	Engine dynamometer in kilowatts
16	H	Engine dynamometer horsepower

LINE EXPLANATION

1st Line	Table number and Title
2nd Line	
ENGINE - (X)	SwRI engine identification number
TEST - (X)	Test number. Tests numbered sequentially. 1XX for Engine 1 and 2XX for Engine 2
RUN - (X)	Run number of a specific test
BETWEEN RUN & DATE	Brief description of engine configuration
(XX) - (XX) - (XX)	Date in month, day and year
K = (X.XXX)	Humidity correction factor for cycle composite NO_2. $K = .634 + .00654\ H - .000022H^2$. Where H = absolute humidity in grams/lb DA
HUM = (XX.X) G/KG	Absolute humidity in grams/kilogram
Line Starting CYCLE COMPOSITE	Grams/kw-hr for cycle, summation of the weighted emission for each mode divided by the summation of the weighted power for each mode, i.e. $\frac{\Sigma(\text{Emission} \times \text{W.F.})}{\Sigma(\text{kw} \times \text{W.F.})}$

TABLE A-3. (Cont'd) EXPLANATION OF NINE-MODE FTP[17] COMPUTER PRINTOUT SHEETS

AVERAGE SUM - (COMPOSITE VALUES FOR CYCLES 1 & 2)	$\frac{\text{SUM (Cycle 1)} + \text{SUM (Cycle 2)}}{2}$
AVERAGE SUM - (COMPOSITE VALUES FOR CYCLES 3 & 4)	$\frac{\text{SUM (Cycle 3)} + \text{SUM (Cycle 4)}}{2}$
FOUR CYCLE COMPOSITE	Composite of all four cycles in Grams/kW-hr and (grams/bhp-hr) using formula shown
CORRECTED NO_2	Four cycle composites NO_x as NO_2 times the humidity correction factor, K.
SFC	Calculated in the same manner as the emissions using the formulas given for CYCLE COMPOSITE through FOUR CYCLE COMPOSITE

TABLE A-4. EXPLANATION OF NINE-MODE EPA[14] COMPUTER PRINTOUT SHEETS

COLUMN EXPLANATION (UPPER COLUMNS)

Column	Column Title	Explanation
1	MODE	Mode number and % of max. torque
2	AS MEASURED HC-FID	Measured hydrocarbon emissions, ppmC
3	AS MEASURED CO	Measured carbon monoxide emissions in percent
4	AS MEASURED CO_2	Measured carbon dioxide emissions in percent
5	AS MEASURED NO_x-CL	Measured oxides of nitrogens emissions in ppm NO_x
6	TOTAL CARBON	The percentage of exhaust gas that is carbon containing gases
7	FUEL G/HR	Engine fuel consumption in Grams/Hr
8	CALCULATED G/HR HC	Hydrocarbon emissions in Grams/Hr. calculated from measured HC (HC by FID corrected to dry gas basis)
9	CALCULATED G/HR CO	Carbon monoxide emissions in Grams/Hr calculated from measured CO
10	CALCULATED G/HR NO_x	Oxides of nitrogen emissions in Grams/Hr calculated as NO_2 from measured NO_x and humidity corrected using factor K
11	WT. FACT.	Weighting factor for each mode
12	WEIGHTED G/HR HC-FID	Hydrocarbon emissions in Grams/Hr. times the weighting factor
13	WEIGHTED G/HR CO	Carbon monoxide emissions in Grams/Hr. times the weighting factor
14	WEIGHTED G/HR NO_x-CL	Oxides of nitrogen emissions as NO_2 Grams/Hr. times the weighting factor

TABLE A-4 (Cont'd). EXPLANATION OF NINE-MODE EPA[14] COMPUTER PRINTOUT SHEETS

COLUMN EXPLANATION (UPPER COLUMNS)

Column	Column Title	Explanation
15	CKW	Corrected engine dynamometer power in kilowatts
16	VAC. MM	Measured manifold vacuum in millimeters of mercury

COLUMN EXPLANATION (LOWER COLUMNS)

Column	Column Title	Explanation
1	MODE	Mode number and % of max. torque
2	ID	Defined at bottom of the printout sheet when column is used
3	MV	Manifold vacuum in inches of mercury
4	CHP	Corrected brake horsepower
5	CTQ	Corrected torque in ft-lbs
6	FC	Fuel consumption in lbs/hr
7	BSFC	Brake specific fuel consumption in lbs/bhp-hr
8	$BSNO_x$	Brake specific NO_x as NO_2 emissions in g/bhp-hr
9	F/A	Computer dry fuel to air ratio (computed using HC and CO emission rates)
10	SFC KG/KW HR	Specific fuel consumption in kg/kw-hr
11	RPM	Engine speed in revolution per minute
12	CALC A/F	Inverse of the F/A in column 9
13-17	PERCENT OF TOTAL	Percent contribution of that mode to the total weighted composite value for that cycle.

TABLE A-4 (Cont'd). EXPLANATION OF NINE-MODE EPA[14] COMPUTER PRINTOUT SHEETS

LINE EXPLANATION	EXPLANATION
1st line	Table number and Title
2nd line	
ENGINE- (X)	SwRI engine identification number
TEST - (X)	Test number. Tests numbered sequentially. 1XX for Engine 1 and 2XX for Engine 2.
RUN - (X)	Run number of a specific test.
(XX) - (XX) - (XX)	Date in month, day and year.
BETWEEN DATE & K	Brief description of engine configuration.
K = (X.XXX)	Humidity corrector factor for cycle composite NO_2. $K = .634 + .00654\ H - .0000222H^2$. Where H = absolute humidity in grams/lb DA
HUM = (XX.X) G/KG	Absolute humidity in grams/kilogram
Line Starting CYCLE COMPOSITE	Grams/kW-hr for cycle, summation of the weighted emission for each mode divided by the summation of the weighted power for each mode, i.e, $\frac{\Sigma\ (\text{Emission} \times \text{W.F.})}{\Sigma\ (\text{kW} \times \text{W.F.})}$
AVERAGE SUM - (COMPOSITE VALUES FOR CYCLES 1 AND 2	$\frac{\text{SUM (cycle 1)} + \text{SUM (cycle 2)}}{2}$
AVERAGE SUM - (COMPOSITE VALUES FOR CYCLES 3 AND 4)	$\frac{\text{SUM (cycle 3)} + \text{SUM (cycle 4)}}{2}$
FOUR CYCLE COMPOSITE	Composite of all four cycles in Grams/kW-hr and (grams/bhp-hr) using formula shown
SFC	Calculated in the same manner as the emissions using the formulas given for CYCLE COMPOSITE through FOUR CYCLE COMPOSITE

TABLE A-5. EXPLANATION OF EXPERIMENTAL 23-MODE[18] COMPUTER PRINTOUT SHEETS

COLUMN EXPLANATION (UPPER COLUMNS)

Column	Column Title	Explanation
1	MODE	Mode number (1-23)
2	SPEED	Engine speed in rpm
3	TQ N-M	Measured dynamometer load in N. m.
4	KW	Power calculated from dynamometer load and speed using equation: $KW = \frac{(ft\text{-}lbs) \times rpm}{5252} * .7457$
5	MV MM	Measured manifold vacuum in millimeters of Mercury
6	FUEL KG/HR	Measured kg/hr of fuel used
7	A/F RATIO	Air-fuel ratio (calculated using the equations in the Recommended Nine-Mode Procedure[14]
8		Column not used
9	DRY CONCENTRATION HC	Measured hydrocarbon emission concentration (ppmC) corrected to a dry basis
10	DRY CONCENTRATION CO	Measured carbon monoxide emission concentration, % by volume. Measured dry
11	DRY CONCENTRATION CO_2	Measured carbon dioxide emission concentration, % by volume. Measured dry.
12	DRY CONCENTRATION NO_x	Measured oxides of nitrogen emission concentration as NO (ppm). Measured dry.

TABLE A-5 (Cont'd). EXPLANATION OF EXPERIMENTAL 23-MODE[18] COMPUTER PRINTOUT SHEETS

COLUMN EXPLANATION (LOWER COLUMNS)

Column	Column Title	Explanation
1	MODE	Mode number (1-23)
2		Column not used.
3	CALCULATED GRAM/HR HC	Calculated hydrocarbon emission concentration in grams/hr $HC\ (g/hr) = \frac{HC}{10000} \times \frac{\text{fuel flow (grams/hr)}}{\text{total carbon}}$
4	CALCULATED GRAM/HR CO	Calculated carbon monoxide emission concentration in grams/hr $CO = 2.02 \times CO \times \frac{\text{fuel flow (grams/hr}}{\text{total carbon}}$
5	CALCULATED GRAM/HR NO_x	Calculated oxides of nitrogen emission concentration as NO_2 in grams/hr $NO_2 = 3.32 \times \frac{NO_x}{1000} \times \frac{\text{fuel flow (grams/hr)}}{\text{total carbon}}$
6	WT. FAC.	Weighting factor for each mode
7	E. UNITS TQ	Torque in ft-lbs
8	E. UNITS FC	Fuel Consumption in lbs/hr
9	SPECIFIC GRAM/KW-HR HC	HC, g/hr, (Column 3) divided by kW (Column 4, upper table) for the individual mode
10	SPECIFIC GRAM/KW-HR CO	CO, g/hr, (Column 4) divided by kW (Column 4, upper table) for the individual mode.
11	SPECIFIC GRAM/KW-HR NO_x	NO_2, g/hr, (Column 5) divided by kW (Column 4, upper table) for the individual mode.

TABLE A-5 (Cont'd). EXPLANATION OF EXPERIMENTAL 23-MODE[18] COMPUTER PRINTOUT SHEETS

CYCLE COMPOSITE	EXPLANATION
HC, CO, NO_X	Summation of the weighted emission (g/hr) for each mode divided by summation of the weighted power (kW) for each mode. Given in g/kW-hr and in (g/bhp-hr) $\frac{\sum_{i=1}^{23} (\text{Emission}_{(i)} \times \text{W. F.}_{(i)})}{\sum_{i=1}^{23} (\text{kW}_{(i)} \times \text{W.F.}_{(i)})}$
SFC	Summation of fuel flow (kg/hr) times weighting factor for each mode divided by summation of weighted power (kW) for each mode. Given in kg/kW-hr and in (lb/bhp-hr) $\frac{\sum_{i=1}^{23} (\text{Fuel flow}_{(i)} \times \text{W.F.}_{(1)})}{\sum_{i=1}^{23} (\text{kW}_{(i)} \times \text{W.F.}_{(1)})}$
CORRECTED NO_X	CYCLE COMPOSITE NOx times factor K. Where $K = .634 + .00654H - .0000222H^2$ Given in g/kW-hr and in (lb/bhp-hr)

TABLE A-6. IGNITION TIMING AT 2000 RPM

Manifold Vacuum, Hg		350-HD*	350-HEI** Distributor		1975 Cadillac***
mm	inches	Stock Dist.			with EFI
0	0	14	14	16	16
50.8	2	14	14	16	16
101.6	4	14	14	16	16
152.4	6	14	17	19	18
203.2	8	14	21	23	21
254.0	10	14	24	26	24
304.8	12	14	27	29	26
355.6	14	14	28	30	28
406.4	16	14	28	30	30
457.2	18	14	28	30	30
508.0	20	14	28	30	30
Idle (600 rpm)		4	3	5	12

Source of Data:
* - Measured on two engines in this project - Idle set for Engine Label
** - Measured on one engine in this project
*** - 1975 Cadillac shop manual - EFI supplement

Table A-7. Proposed Service Accumulation

The applicable sections of the Service Accumulation requirements given in the Proposed Rules,[15] are reproduced in this appendix.

86.079-26 Mileage and service accumulation; emissions measurements

(a) NOT APPLICABLE

(b) (1) Paragraph (b) of this section applies to heavy duty engines.

(2) (i) For gasoline-fueled engines, the dynamometer service accumulation schedule will consist of several operating conditions which give the percent loads and the modes as specified in the following chart. The percentage of times in each mode must be held within the limits specified. The maximum observed torque for each mode in the service accumulation cycle, must be determined at the rpm at which the mode is being conducted. The percent load for that mode will be determined from the maximum torque at the rpm the mode is being conducted.

Mode	Observed torque (percent of maximum observed)	Percentage of time
Idle	Idle	23 (22-24)
Closed throttle (CT)	CT	31 (30-32)
Part throttle deceleration (PTD)	10	15 (14-16)
Cruise	25	6 (5- 7)
Part throttle escalation	55	11 (10-12)
Full load (FL)	90	14 (13-15)

(ii) The equivalent control parameter for engine loading will be manifold vacuum, manifold pressure, or torque. Usage of one of the three parameters will require approval in advance by the Administrator. The control parameter values that correspond to the appropriate percent loads as specified in the emission test cycle will be initially determined at the zero-hour point or after an appropriate break-in procedure. The control parameter values determined initially will be used for the entire service accumulation schedule. If at any time during the service accumulation, the 90% torque value cannot be attained, the engine shall be operated at wide open throttle.

(iii) The average speed shall be between 1650 and 1700 rpm. Subject to the requirements as to average speed, there must be operation at speeds in excess of 3200 rpm (but not in excess of governed speed for governed engines or rated speed for non-governed engines) for a cumulative maximum of 0.5 percent of the actual cycle time, excluding time in transient conditions. Maximum cycle time shall be 15 minutes. A cycle approved in advance by the Administrator shall be used.

(3) - (5) NOT APPLICABLE

(6) Durability data engines: Each gasoline-fuel durability data engine shall be operated, with all emission control systems installed and operating,

for 1500 hours. Emission measurement, as prescribed, shall be made at 125 hours of operation. No zero hour emission test will be required ~~or allowed~~.

(7) All tests required by this subpart to be conducted after 125 hours of operation or at any multiple of 125 hours may be conducted at any accumulated number of hours within 8 hours of 125 hours or the appropriate multiple of 125 hours, respectively.

(8) - (12) NOT APPLICABLE

86.079-27 NOT APPLICABLE

86.079-28 Compliance with emission standards

(a) NOT APPLICABLE

(b) (1) Paragraph (b) of this section applies to heavy duty engines.

(2) - (3) NOT APPLICABLE

(4) The procedure for determining compliance of a new engine with exhaust emission standards is as follows:

(i) Separate emission deterioration factors shall be determined from the emission results of the durability data engines for each engine-system combination.

(A) The applicable results to be used in determining the deterioration factors for each combination shall be:

(1) All emission data from the tests required under 86.079-26(b)(6).

(2) & (3) All emission data from the test conducted before and after maintenance -------

(B) All applicable emission results shall be plotted as a function of durability hours which shall be consistently rounded to the nearest hour. Emission data shall have two figures to the right of the decimal. The best fit straight lines, fitted by the method of least squares shall be drawn through these data points. The interpolated 125-hour and 1500-hour points for gasoline-fueled engines or the 1000-hour points for Diesel engines on each line, rounded to whole numbers in accordance with ASTM E 29-67, must be within the standards specified in 86.077-10 for gasoline-fueled engines or the data shall not be used in the calculation of the deterioration.

(C) The interpolated values shall be used to calculate a deterioration factor as follows:

Factor = Exhaust emissions interpolated to 1500 hours for gasoline-fueled engines or to 1000 hours for Diesel engines minus the exhaust emissions interpolated to 125 hours. (Negative deterioration factors shall be considered zero).

(ii) The appropriate deterioration factor, carried out to two places to the right of the decimal point, shall be added to the exhaust emission test results, carried out to two places to the right of the decimal point, for each emission data engine.

(iii) The emission values to compare with the standards shall be the adjusted emission values of paragraph (b)(4)(ii) of this section rounded to whole numbers in accordance with ASTM E 29-67 for each emission data engine.

APPENDIX B

BASELINE RESULTS

B-1 Summary of the Results - Engine 1
B-2 Summary of the Results - Engine 2
B-3 through B-24 Computer Printouts - Engine 1
B-25 through B-46 Computer Printouts - Engine 2

TABLE B-1. BASELINE EVALUATIONS - ENGINE 1

Test No.	Run No.	Type Test	Description	GRAM/kW Hr HC	CO	NO_x	HC+NO_x	KG/kW HR SFC	Appendix Table
101	1	9-FTP	Baseline with Initial Carburetor	5.721	56.073	11.301	17.022	.517	B-3
	2			5.474	59.629	11.624	17.098	.522	B-4
	3			5.123	58.351	12.157	17.280	.505	B-5
			Average	5.439	58.018	11.694	17.133	.515	
			Standard Deviation	0.30	1.04	0.43	0.13	.009	
105	1	9-EPA	Baseline with Initial Carburetor	4.773	61.686	9.437	14.210	.479	B-6
	2			4.976	67.909	10.088	15.064	.472	B-7
	3			5.039	71.899	9.899	14.939	.471	B-8
			Average	4.929	67.165	9.808	14.738	.474	
			Standard Deviation	0.14	5.15	0.34	0.46	.004	
103	1	23-Mode	Baseline with Initial Carburetor	10.183	71.769	11.758	21.941	.441	B-9
	2			9.756	114.005	8.962	18.718	.436	B-10
	3			9.996	105.217	9.701	19.697	.436	B-11
			Average	9.978	96.997	10.140	20.119	.438	
			Standard Deviation	0.21	22.29	1.45	1.65	.003	
104	2 & 3	WOT	Baseline with Initial Carburetor	4.36	291.90	6.12	10.48	.385	B-12
104	2 & 3	S.S.	Various Extra Modes with Initial Carburetor						B-12
106	1	9-FTP	Baseline Carb. 6607	5.544	22.483	12.421	17.965	.534	B-13
	2			5.355	20.101	12.082	17.437	.535	B-14
	3			5.432	24.698	11.711	17.143	.535	B-15
			Average	5.444	22.43	12.071	17.515	.535	
			Standard Deviation	0.10	2.30	0.36	0.417	.001	
107	1	9-EPA	Baseline Carb. 6607	4.727	36.350	10.264	14.990	.478	B-16
	2			4.070	25.318	10.956	15.025	.476	B-17
	3			4.038	30.341	10.936	14.974	.471	B-18
			Average	4.278	30.670	10.719	14.996	.475	
			Standard Deviation	0.39	5.52	0.39	0.03	.004	
109	1	9-EPA	Baseline Repeat	3.560	27.826	10.925	14.485	.482	B-19
	2			3.444	30.303	11.383	14.827	.477	B-20
			Average	3.502	29.065	11.154	14.656	.480	
			Standard Deviation	0.08	1.75	0.32	0.24	.004	
-	-	9-EPA	Average of Tests 107 and 109	3.968	30.028	10.893	14.860	.477	
108	1	23-Mode	Baseline Carb. 6607	9.935	92.909	9.815	19.750	.467	B-21
	2			9.867	102.396	9.480	19.347	.465	B-22
	3			9.937	104.418	9.240	19.177	.466	B-23
			Average	9.913	99.908	9.512	19.425	.466	
			Standard Deviation	0.04	6.15	0.29	0.29	.001	
107	1, 2 & 3	WOT		4.14	241.98	5.88	10.02	.366	B-24
109	1, 2 & 3	WOT		4.48	253.30	4.58	9.06	.369	B-24
-	-	WOT	Average of Tests 107 and 109	4.31	247.64	5.23	9.54	.368	

TABLE B-2. BASELINE EVALUATIONS - ENGINE 2

Test No.	Run No.	Type Test	Description	GRAM/kW Hr HC	CO	NO_x	HC+NO_x	KG/ kW HR SFC	Appendix Table
201	2	9-FTP	Baseline with Initial Carburetor	5.609	58.268	12.637	18.246	.485	B-25
	3			7.168	48.509	13.531	20.699	.486	B-26
			Average	6.389	53.389	13.084	19.473	.486	
			Standard Deviation	1.10	6.90	0.63	1.74	.001	
205	2	9-EPA	Baseline with Initial Carburetor	7.026	68.087	13.837	20.863	.475	B-27
	3			6.919	71.885	13.663	20.582	.484	B-28
			Average	6.973	69.986	13.750	20.723	.480	
			Standard Deviation	0.08	2.69	0.12	0.20	.006	
203	1	23-Mode	Baseline with Initial Carburetor	10.373	87.268	10.923	21.296	.436	B-29
	2			10.131	125.226	9.033	19.164	.424	B-30
	3			10.769	121.606	9.201	19.970	.435	B-31
			Average	10.424	111.367	9.719	20.143	.432	
			Standard Deviation	0.32	20.95	1.05	1.08	.007	
204	1 & 2	WOT	Baseline with Initial Carburetor	5.24	325.18	3.65	8.89	.389	B-32
204	1 & 2	S.S.	Baseline						B-32
210	1	9-FTP	Baseline Carb. 6606	6.685	26.798	11.821	18.506	.526	B-33
	2			6.717	29.975	12.226	18.943	.530	B-34
	3			6.318	31.588	12.103	18.421	.533	B-35
			Average	6.573	29.454	12.050	18.623	.530	
			Standard Deviation	0.22	2.44	0.21	0.28	.004	
211	2	9-EPA	Baseline Carb. 6606	4.755	20.663	13.436	18.191	.440	B-36
	3			5.520	21.628	12.999	18.519	.454	B-37
			Average	5.138	21.146	13.218	18.355	.447	
			Standard Deviation	0.54	0.68	0.31	0.23	.010	
212	1	9-EPA	Baseline Repeat	6.368	36.793	11.803	18.171	.453	B-38
	2			6.273	55.495	10.190	16.463	.452	B-39
			Average	6.321	46.144	10.997	17.317	.453	
			Standard Deviation	0.07	13.22	1.14	1.21	.001	
-	-	9-EPA	Average of Tests 211 and 212	5.729	33.645	12.107	17.836	.450	
209	1	23-Mode	Baseline Carb. 6606	10.409	43.614	11.898	22.307	.427	B-40
	2			10.716	54.177	12.341	23.057	.431	B-41
			Average	10.563	48.896	12.120	22.682	.429	
			Standard Deviation	0.22	7.47	0.31	0.53	.003	
211	2 & 3	WOT		4.49	233.54	6.17	10.66	.353	B-42
212	1 & 2	WOT		4.77	237.70	5.43	10.20	.357	B-42
-	-	WOT	Average of Tests 211 and 212	4.63	235.62	5.80	10.43	.355	

TABLE B-3. MASS EMISSIONS BY NINE-MODE FTP -METRIC UNITS

ENGINE 1 TEST-101 RUN-1 CHEV. 350 BASELINE 03-11-76 K =1.095 HUM = 13.0 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NO2	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NO2-CL	KW	HP
1 IDLE	3725	.628	11.12	38	12.121	1729	53	181	2	.232	12.3	42	.9	0	0
2 16 HG	906	.771	13.56	280	14.922	9027	57	975	58	.077	4.4	75	4.5	12	16
3 10 HG	898	.856	13.98	1050	14.926	14062	85	1629	328	.147	12.4	239	48.3	35	48
4 16 HG	459	.771	13.83	300	14.696	9027	28	960	61	.077	2.2	74	4.7	12	16
5 19 HG	1347	.590	12.79	90	13.914	6169	62	501	14	.057	3.5	29	.8	0	0
6 16 HG	363	.690	13.83	300	14.556	9027	23	865	62	.077	1.7	67	4.8	12	16
7 3 HG	817	.613	13.98	1875	14.675	14505	109	1696	827	.113	12.3	186	93.5	58	78
8 16 HG	363	.995	13.70	270	14.681	9027	25	1173	55	.077	1.7	90	4.2	12	16
9 C.T.	18973	.193	9.95	19	11.990	1678	270	57	1	.193	38.6	8	.1	0	0
											5.7	52	10.9		
	-----------CYCLE COMPOSITE IN G / KW HR----------														
1 IDLE	3596	.690	10.99	90	12.035	1729	51	200	2	.232	11.8	96	.9	0	0
2 16 HG	725	.809	13.56	285	14.937	9027	95	1016	59	.077	3.5	78	4.6	12	16
3 10 HG	910	.838	13.98	1050	14.909	14062	84	1547	329	.147	12.6	235	48.3	35	48
4 16 HG	453	.821	13.56	310	14.927	9027	26	1038	69	.077	2.2	80	5.0	12	16
5 19 HG	1348	.969	12.87	105	13.979	6169	62	939	16	.057	3.5	25	.9	0	0
6 16 HG	453	.771	13.56	320	14.376	9027	28	978	67	.077	2.2	75	5.1	12	16
7 3 HG	909	.706	13.98	2050	14.777	14505	120	1883	898	.113	13.6	213	101.5	58	78
8 16 HG	909	1.038	13.56	280	14.639	9027	25	1293	57	.077	1.9	100	4.4	12	16
9 C.T.	18908	.181	9.05	19	11.072	1678	279	55	1	.193	39.9	8	.1	0	0
											5.9	55	10.9		
	-----------CYCLE COMPOSITE IN G / KW HR----------														
1 IDLE	3638	.690	11.12	99	12.179	1729	52	197	2	.232	12.0	96	.5	0	0
2 16 HG	798	.722	13.70	350	14.997	9027	97	908	72	.077	3.6	70	5.6	12	16
3 10 HG	887	.809	13.98	1125	14.873	14062	89	1536	353	.147	12.3	226	51.9	35	48
4 16 HG	612	.995	13.56	290	14.566	9027	38	1183	60	.077	2.9	91	4.6	12	16
5 19 HG	1415	.992	12.87	110	13.953	6169	65	909	17	.057	3.7	23	1.0	0	0
6 16 HG	477	.856	13.70	320	14.603	9027	29	1068	66	.077	2.3	82	5.1	12	16
7 3 HG	978	.838	13.98	2025	14.916	14505	128	2215	874	.113	14.4	250	99.3	58	78
8 16 HG	931	.982	13.56	300	14.585	9027	27	1227	62	.077	2.1	94	4.7	12	16
9 C.T.	16909	.181	9.66	21	11.982	1678	290	53	1	.193	39.3	8	.1	0	0
											5.6	57	11.1		
	-----------CYCLE COMPOSITE IN G / KW HR----------														
1 IDLE	3598	.693	11.12	93	12.118	1729	50	185	2	.232	11.7	93	.5	0	0
2 16 HG	680	.771	13.56	300	14.399	9027	93	976	62	.077	3.3	75	4.8	12	16
3 10 HG	955	.821	13.98	1150	14.897	14062	90	1566	360	.147	13.3	230	53.0	35	48
4 16 HG	999	1.038	13.91	270	14.998	9027	31	1306	56	.077	2.4	101	4.3	12	16
5 19 HG	1231	.590	12.35	95	13.013	6169	58	517	15	.057	3.3	29	.9	0	0
6 16 HG	477	.891	13.70	310	14.638	9027	29	1110	63	.077	2.3	85	4.9	12	16
7 3 HG	966	.771	13.98	1900	14.848	14505	127	2046	829	.113	14.3	231	93.6	58	78
8 16 HG	959	.982	13.70	300	14.727	9027	28	1215	61	.077	2.1	94	4.7	12	16
9 C.T.	17427	.193	9.95	20	11.385	1678	257	57	1	.193	36.7	8	.1	0	0
											5.7	58	10.7		
	-----------CYCLE COMPOSITE IN G / KW HR----------										5.8	54	10.7		
											5.7	57	10.9		

AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)----------

AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 9)----------

FOUR CYCLE COMPOSITE -

HC- FID	0.35(5.8)	+ 0.65(5.7)	= 5.721	G/ KW HR	(4.266 BB)
CO- NDIR	0.35(53.6)	+ 0.65(57.4)	= 56.073	G/ KW HR	(41.819 BB)
NO2-CL	0.35(10.7)	+ 0.65(10.9)	= 10.817	G/ KW HR	(8.066 BB)
		CORRECTED NO2 =	11.301	G/ KW HR	(8.428 BB)
		SFC =	.517	KG/ KW HR	(.899 BB)

TABLE B-4. MASS EMISSIONS BY NINE-MODE FTP -METRIC UNITS

ENGINE-1 TEST-101 RUN-2 CHEV. 350 BASELINE 03-11-76 K =1.058 HUM = 13.8 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NO2	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NO2-CL	KW	HP
1 IDLE	3555	.628	11.35	99	12.339	1729	50	177	2	.232	11.5	41	.5	0	0
2 16 HG	799	.615	13.83	330	14.529	9027	99	772	68	.077	3.8	59	5.2	12	16
3 10 HG	865	.993	13.98	1100	15.009	14198	82	1801	395	.197	12.0	265	50.8	35	98
4 16 HG	909	.856	13.83	330	14.727	9027	25	1060	67	.077	1.9	82	5.2	12	16
5 19 HG	898	.983	12.79	95	13.313	6033	91	992	19	.057	2.3	25	.8	0	0
6 16 HG	930	.619	13.70	320	14.357	9027	27	779	67	.077	2.1	60	5.1	12	16
7 3 HG	887	.821	13.98	1975	14.890	14369	115	2158	853	.113	13.0	244	96.4	58	78
8 16 HG	341	.995	13.70	280	14.679	9027	21	1173	57	.077	1.6	90	4.4	12	16
9 C.T.	19663	.181	9.66	23	11.308	1729	229	56	1	.193	32.0	8	.2	0	0
CYCLE COMPOSITE IN G / KW HR											5.2	57	10.4		
1 IDLE	3559	.613	11.35	97	12.319	1729	50	173	2	.232	11.5	40	.5	0	0
2 16 HG	799	.891	13.56	300	14.530	9027	99	1118	62	.077	3.8	86	4.8	12	16
3 10 HG	888	1.019	13.98	1150	15.088	14198	84	1937	359	.197	12.3	285	52.8	35	98
4 16 HG	357	.873	13.56	310	14.469	9027	22	1100	64	.077	1.7	85	4.4	12	16
5 19 HG	1387	.992	12.35	95	12.930	6033	65	916	15	.057	3.7	24	.8	0	0
6 16 HG	959	.909	13.56	300	14.519	9027	28	1141	62	.077	2.2	88	4.8	12	16
7 3 HG	932	.821	13.98	2025	14.895	14369	121	2157	874	.113	13.7	244	98.8	58	78
8 16 HG	343	1.057	13.56	300	14.659	9027	22	1316	61	.077	1.7	101	4.7	12	16
9 C.T.	15712	.193	9.66	22	11.929	1729	237	59	1	.193	33.9	8	.2	0	0
CYCLE COMPOSITE IN G / KW HR											5.5	62	11.2		
1 IDLE	3287	.598	11.35	99	12.277	1729	96	170	2	.232	10.7	39	.5	0	0
2 16 HG	692	.856	13.70	300	14.625	9027	93	1067	61	.077	3.3	82	4.7	12	16
3 10 HG	887	.995	13.83	1100	14.863	14198	85	1823	349	.197	12.4	268	51.3	35	98
4 16 HG	953	.891	13.56	290	14.496	9027	28	1120	60	.077	2.2	86	4.6	12	16
5 19 HG	1589	.915	12.97	100	13.099	6033	74	388	15	.057	4.2	22	.9	0	0
6 16 HG	953	.706	13.70	350	14.451	9027	28	891	73	.077	2.2	69	5.6	12	16
7 3 HG	1295	.659	13.56	1850	14.393	14369	168	1797	829	.113	19.0	203	93.7	58	78
8 16 HG	931	1.038	13.41	250	14.491	9027	27	1306	52	.077	2.1	101	4.0	12	16
9 C.T.	15336	.193	9.95	21	11.176	1729	237	60	1	.193	33.8	9	.2	0	0
CYCLE COMPOSITE IN G / KW HR											5.8	57	10.7		
1 IDLE	2670	.559	11.59	97	12.411	1729	37	155	2	.232	8.6	36	.5	0	0
2 16 HG	747	.995	13.28	280	14.299	9027	97	1205	59	.077	3.6	93	4.5	12	16
3 10 HG	875	.891	13.83	1150	14.808	14198	84	1725	366	.197	12.3	259	53.8	35	98
4 16 HG	959	.982	13.56	290	14.587	9027	28	1227	60	.077	2.2	94	4.6	12	16
5 19 HG	1660	.915	12.79	100	13.321	6033	75	380	15	.057	4.3	22	.9	0	0
6 16 HG	930	.690	13.56	320	14.293	9027	27	881	67	.077	2.1	68	5.2	12	16
7 3 HG	1097	1.000	13.98	2025	15.085	14369	139	2599	863	.113	15.2	293	97.5	58	78
8 16 HG	931	.963	13.56	300	14.566	9027	27	1205	62	.077	2.1	93	4.8	12	16
9 C.T.	13967	.193	9.66	24	11.299	1729	219	60	1	.193	30.6	9	.2	0	0
CYCLE COMPOSITE IN G / KW HR											5.3	62	11.2		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)											5.3	60	11.1		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 9)											5.5	60	10.9		

FOUR CYCLE COMPOSITE -

HC- FID 0.35(5.3) + 0.65(5.5) = 5.479 G/ KW HR (9.082 88)

CO- NDIR 0.35(59.5) + 0.65(59.7) = 59.629 G/ KW HR (99.965 88)

NO2-CL 0.35(11.1) + 0.65(10.9) = 10.986 G/ KW HR (8.192 88)

CORRECTED NO2 = 11.629 G/ KW HR (8.668 88)

SFC = .522 KG/ KW HR (.858 88)

TABLE B-5. MASS EMISSIONS BY NINE-MODE FTP -METRIC UNITS

ENGINE-1 TEST-101 RUN-3 CHEV. 350 BASELINE 03-11-76 K =1.062 HUM = 19.0 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NO2	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NO2-CL	KW	MP
1 IDLE	3593	.969	11.12	97	11.993	1729	51	137	2	.232	11.9	32	.5	0	0
2 16 HG	792	.693	13.56	320	14.283	8759	99	797	65	.077	3.7	61	5.0	12	16
3 10 HG	830	.995	13.83	1175	14.858	13835	77	1777	363	.197	11.9	261	53.9	35	98
4 16 HG	908	1.038	13.91	290	14.989	8759	25	1267	58	.077	1.9	98	4.5	12	16
5 19 HG	1278	.969	12.60	100	13.197	5851	57	920	15	.057	3.2	29	.8	0	0
6 16 HG	908	.891	13.56	350	14.992	8759	25	1087	70	.077	1.9	84	5.4	12	16
7 3 HG	795	.722	13.98	2100	14.782	19187	103	1893	905	.113	11.7	219	102.3	58	78
8 16 HG	363	1.097	13.91	330	14.593	8759	22	1333	66	.077	1.7	103	5.1	12	16
9 C.T.	15713	.198	9.66	21	11.930	1633	229	57	1	.193	32.1	8	.1	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.1	57	11.9		
1 IDLE	3731	.583	11.35	98	12.306	1729	52	165	2	.232	12.1	38	.5	0	0
2 16 HG	792	.690	13.56	340	14.329	8759	98	852	69	.077	3.7	66	5.3	12	16
3 10 HG	808	.909	13.98	1175	14.969	13835	75	1696	361	.197	11.0	249	53.0	35	98
4 16 HG	931	.982	13.91	320	14.935	8759	26	1202	69	.077	2.0	93	5.0	12	16
5 19 HG	1396	.928	12.74	110	13.303	5851	59	381	16	.057	3.4	22	.9	0	0
6 16 HG	931	.856	13.56	340	14.959	8759	26	1097	68	.077	2.0	81	5.3	12	16
7 3 HG	863	.873	13.83	2075	14.789	19187	112	2288	899	.113	12.7	259	101.0	58	78
8 16 HG	390	1.117	13.91	280	14.561	8759	20	1356	56	.077	1.6	104	4.3	12	16
9 C.T.	13980	.193	9.77	23	11.361	1633	201	56	1	.193	28.7	8	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.0	59	11.3		
1 IDLE	3912	.559	11.47	98	12.915	1729	54	155	2	.232	12.6	36	.5	0	0
2 16 HG	797	.722	13.56	340	14.357	8759	96	889	69	.077	3.5	68	5.3	12	16
3 10 HG	807	.995	13.83	1200	14.855	13835	75	1777	371	.197	11.0	261	54.5	35	98
4 16 HG	906	.982	12.74	285	13.762	8759	26	1261	60	.077	2.0	97	4.6	12	16
5 19 HG	1031	.969	12.60	105	13.172	5851	56	921	15	.057	2.6	29	.9	0	0
6 16 HG	363	.809	13.70	360	14.591	8759	22	978	72	.077	1.7	75	5.6	12	16
7 3 HG	789	.706	13.98	2100	14.764	19187	102	1859	906	.113	11.5	209	102.9	58	78
8 16 HG	386	1.097	13.91	280	14.595	8759	23	1333	56	.077	1.8	103	4.3	12	16
9 C.T.	16385	.216	9.95	23	11.305	1633	237	63	1	.193	33.8	9	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.2	57	11.9		
1 IDLE	3552	.590	11.35	50	12.295	1729	50	153	2	.232	11.6	36	.5	0	0
2 16 HG	793	.873	13.56	320	14.512	8759	98	1069	64	.077	3.7	82	4.9	12	16
3 10 HG	853	1.019	13.83	1200	14.934	13835	79	1907	369	.197	11.6	280	54.3	35	98
4 16 HG	953	1.038	13.28	310	14.363	8759	28	1278	63	.077	2.1	98	4.8	12	16
5 19 HG	1120	.969	12.97	105	13.051	5851	50	925	16	.057	2.9	29	.9	0	0
6 16 HG	908	.856	13.56	360	14.957	8759	25	1097	72	.077	1.9	81	5.6	12	16
7 3 HG	795	.771	13.83	2125	14.680	19187	109	2035	922	.113	11.7	230	104.2	58	78
8 16 HG	362	1.077	13.28	300	14.393	8759	22	1323	61	.077	1.7	102	4.7	12	16
9 C.T.	16033	.193	9.95	23	11.296	1633	233	56	1	.193	33.3	8	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.2	60	11.6		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)----------											5.0	58	11.3		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 4)----------											5.2	59	11.5		

FOUR CYCLE COMPOSITE -

HC- FID 0.35(5.0) + 0.65(5.2) = 5.123 G/ KW HR (3.820 BB)

CO- NDIR 0.35(57.9) + 0.65(58.6) = 58.351 G/ KW HR (93.512 BB)

NO2-CL 0.35(11.3) + 0.65(11.5) = 11.492 G/ KW HR (8.533 BB)

CORRECTED NO2 = 12.157 G/ KW HR (9.065 BB)

SFC = .505 KG/ KW HR (.830 BB)

TABLE B-6. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-105 RUN-1 CHEV. 350 BASELINE 03-24-76 K= 1.092 HUM= 12.8 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	2800	.380	11.94	98	12.452	1950	98	118	3	.232	11.2	27	.6	0.0	937
2 25 PCT T	330	.430	14.27	500	14.792	10498	30	617	123	.077	2.3	48	9.5	17.9	366
3 55 PCT T	700	.910	13.83	1087	14.820	15019	81	1862	381	.197	11.8	279	56.0	37.8	239
4 25 PCT T	270	.390	13.98	465	14.501	9929	21	681	108	.077	1.6	52	8.3	17.2	366
5 10 PCT T	300	.790	13.56	220	14.384	8165	19	906	93	.057	1.1	52	2.5	6.7	927
6 25 PCT T	270	.490	13.98	480	14.501	10115	21	690	116	.077	1.6	53	8.9	17.2	366
7 90 PCT T	830	1.100	13.98	1675	15.175	20185	126	2956	771	.113	14.2	339	87.1	62.7	71
8 25 PCT T	260	.550	13.98	465	14.558	9929	19	762	108	.077	1.5	59	8.3	17.3	366
9 C.T.	19720	.210	10.31	22	12.135	1950	260	68	1	.193	37.1	10	.2	0.0	610
1 IDLE	3560	.670	13.01	99	14.081	1960	53	179	2	.232	12.3	41	.5	0.0	937
2 25 PCT T	430	.490	13.98	510	14.519	10297	35	702	125	.077	2.7	54	9.6	17.9	366
3 55 PCT T	670	.910	13.70	1125	14.686	14696	76	1839	389	.197	11.2	270	57.2	37.9	239
4 25 PCT T	330	.490	13.83	525	14.357	10204	27	709	129	.077	2.0	54	9.9	17.3	366
5 10 PCT T	390	.920	13.19	200	14.198	7938	22	1099	39	.057	1.2	63	2.2	6.8	927
6 25 PCT T	380	.440	14.12	490	14.423	10115	30	643	117	.077	2.3	44	9.0	17.5	366
7 90 PCT T	1110	2.100	13.91	1350	15.637	20865	169	5460	623	.113	19.1	640	70.9	62.8	71
8 25 PCT T	310	.610	14.12	480	14.765	9929	24	833	112	.077	1.8	64	8.6	17.5	366
9 C.T.	19720	.210	10.31	22	12.135	1950	260	68	1	.193	37.1	10	.2	0.0	610

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.2	0.0	0	9.3	R	R	.058	R	600	17.9	13.5	3.0	.3	5.1	0.0
2 25 PCT T	19.9	23.3	41	23.1	.993	5.3	.066	.609	2020	15.1	2.8	5.2	5.2	9.2	7.3
3 55 PCT T	9.2	50.6	132	33.1	.659	7.5	.067	.398	2020	19.9	19.9	30.1	30.9	25.1	30.3
4 25 PCT T	19.9	23.1	41	22.0	.953	9.7	.065	.580	2000	15.3	2.0	5.8	9.6	8.7	7.2
5 10 PCT T	16.8	9.1	24	18.0	1.989	9.8	.065	1.210	2000	15.9	1.3	5.7	1.9	5.3	2.1
6 25 PCT T	19.9	23.1	41	22.3	.969	5.0	.065	.586	2000	15.3	2.0	5.9	9.9	8.8	7.2
7 90 PCT T	2.8	89.1	217	99.5	.629	9.2	.069	.322	2090	19.6	17.2	36.8	98.0	25.9	38.4
8 25 PCT T	19.9	23.1	41	22.0	.950	9.7	.066	.578	2000	15.3	1.8	6.5	9.6	8.7	7.2
9 C.T.	29.0	0.0	0	9.3	R	R	.056	R	1980	17.8	95.0	1.1	.1	3.2	0.0
1 IDLE	17.2	0.0	0	9.1	R	R	.059	R	600	15.6	13.7	3.3	.3	9.9	0.0
2 25 PCT T	19.9	23.9	41	22.7	.971	5.9	.065	.591	2020	15.3	3.0	9.3	5.7	9.0	7.3
3 55 PCT T	9.2	50.8	132	32.9	.637	7.7	.064	.388	2020	15.1	12.5	21.7	39.1	29.5	30.2
4 25 PCT T	19.9	23.1	41	22.5	.972	5.6	.065	.591	2000	15.5	2.3	9.3	5.9	8.9	7.2
5 10 PCT T	16.8	9.1	24	17.5	1.930	9.3	.069	1.179	2000	15.6	1.9	5.0	1.3	5.1	2.1
6 25 PCT T	19.9	23.9	41	22.3	.953	5.0	.066	.580	2020	15.2	2.6	9.0	5.9	8.8	7.3
7 90 PCT T	2.8	89.3	217	96.0	.596	7.9	.071	.332	2090	19.0	21.3	51.3	92.0	26.8	38.5
8 25 PCT T	19.9	23.9	41	22.0	.938	9.8	.066	.571	2020	15.0	2.0	5.1	5.2	8.7	7.3
9 C.T.	29.0	0.0	0	9.3	R	R	.056	R	1980	17.8	91.3	.8	.1	3.2	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 9.5 50 9.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 9.9 68 9.2

TWO CYCLE COMPOSITE -

HC- FID	0.35(9.5) + 0.65(9.9) =	9.723	G/KW	HR	(3.559 GR)
CO- NDIR	0.35(49.7) + 0.65(68.1) =	61.686	G/KW	HR	(45.999 GR)
NOX-CL	0.35(9.9) + 0.65(9.2) =	9.437	G/KW	HR	(7.037 GR)
	HC + NOX =	19.210	G/KW	HR	(10.596 GR)
	SFC =	.979	KG/KW	HR	(.787 GR)

TABLE B-7. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

ENGINE-01 TEST-105 RUN-02 1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
CHEV. 350 BASELINE 03-29-76 K= 1.075 HUM= 19.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
- IDLE	3200	.290	11.72	50	12.364	1950	56	92	3	.232	13.0	21	.7	0.0	999
2 25 PCT T	920	.580	13.98	530	14.608	10206	33	819	132	.077	2.6	63	10.2	17.9	376
3 55 PCT T	800	1.900	13.93	1187	15.321	19970	86	2671	400	.192	12.7	393	58.8	32.8	236
4 25 PCT T	300	.520	14.12	530	14.474	10206	29	731	132	.077	1.8	54	10.1	17.9	368
5 10 PCT T	350	1.100	13.28	220	14.919	8079	22	1299	99	.057	1.2	71	2.5	6.8	992
6 25 PCT T	300	.560	13.98	520	14.574	10206	29	792	130	.077	1.8	61	10.0	17.9	381
7 90 PCT T	1130	1.990	13.56	1525	15.629	20912	169	5118	711	.113	19.1	578	80.3	43.2	63
8 25 PCT T	280	.640	14.12	510	14.792	10206	22	892	126	.077	1.7	69	9.7	17.6	373
9 C.T.	19720	.210	10.31	10	12.135	1950	260	68	1	.193	37.1	10	.1	0.0	617
1 IDLE	3120	.380	13.28	38	14.011	1819	96	99	2	.232	10.6	23	.9	0.0	999
2 25 PCT T	990	.580	13.98	525	14.616	10206	38	818	131	.077	2.9	63	10.1	17.9	381
3 55 PCT T	850	1.100	13.98	1200	15.177	19970	92	2118	908	.192	13.6	311	60.0	38.2	239
4 25 PCT T	340	.520	14.12	530	14.681	10206	28	730	131	.077	2.2	56	10.1	17.6	368
5 10 PCT T	390	1.100	12.96	205	14.088	8079	22	1273	92	.057	1.3	73	2.4	6.9	999
6 25 PCT T	330	.560	13.98	520	14.577	10206	26	792	130	.077	2.0	61	10.0	17.6	373
7 90 PCT T	1130	1.790	13.56	1550	15.479	20912	170	4768	729	.113	19.2	539	82.9	43.2	63
8 25 PCT T	280	.540	14.12	510	14.712	10206	22	785	126	.077	1.7	60	9.7	17.5	373
9 C.T.	15360	.210	10.09	20	11.982	1860	261	46	1	.193	37.3	9	.2	0.0	617

MODE	---UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE--- HV	CHP	CTQ	FC	ASFC	ASNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	HC	-------PERCENT OF TOTAL------- CO	NOX	FUEL	POWER
1 IDLE	17.5	0.0	0	9.3	R	R	.056	R	600	17.7	14.3	1.6	.9	5.2	0.0
2 25 PCT T	19.8	23.3	41	22.5	.965	5.7	.066	.592	2000	15.2	2.8	9.8	5.6	9.0	7.3
3 55 PCT T	9.3	50.7	133	31.9	.629	8.0	.069	.383	2000	19.4	13.9	29.7	32.3	29.3	30.1
4 25 PCT T	19.6	23.3	41	22.5	.966	5.7	.066	.587	2000	15.1	2.0	9.3	5.6	9.0	7.2
5 10 PCT T	17.9	9.1	29	17.8	1.951	9.9	.065	1.187	2000	15.3	1.9	5.9	1.4	5.2	2.1
6 25 PCT T	15.0	23.3	41	22.5	.966	5.6	.064	.592	2010	15.2	2.0	9.6	5.5	9.0	7.2
7 90 PCT T	2.5	89.8	218	45.0	.531	8.5	.071	.323	2090	19.1	20.9	93.7	99.0	26.3	38.7
8 25 PCT T	19.7	23.4	61	22.5	.955	5.9	.067	.581	2020	15.0	1.9	5.2	5.3	9.0	7.3
9 C.T.	29.3	0.0	0	9.3	R	R	.056	R	2000	17.8	90.8	.7	.0	3.2	0.0
1 IDLE	17.5	0.0	0	9.0	R	R	.063	R	620	15.9	11.6	1.9	.2	9.8	0.0
2 25 PCT T	15.0	23.9	61	22.5	.963	5.7	.064	.584	2000	15.2	3.2	5.3	5.9	9.0	7.2
3 55 PCT T	9.9	51.2	133	31.9	.623	8.1	.069	.379	2020	19.6	15.0	26.0	32.9	29.9	30.3
4 25 PCT T	19.5	23.6	61	22.5	.959	5.7	.066	.580	2020	15.1	2.9	9.7	5.5	9.0	7.3
5 10 PCT T	17.5	9.2	29	17.8	1.928	9.4	.065	1.173	2020	15.6	1.9	6.1	1.3	5.3	2.1
6 25 PCT T	14.7	23.6	61	22.5	.959	5.6	.066	.580	2020	15.2	2.2	5.1	5.9	9.0	7.3
7 90 PCT T	2.5	89.8	218	45.0	.531	8.7	.070	.323	2090	19.2	21.2	95.1	99.5	26.9	38.5
8 25 PCT T	19.7	23.5	61	22.5	.954	5.9	.066	.582	2020	15.1	1.9	5.1	5.2	9.0	7.3
9 C.T.	29.3	0.0	0	9.1	P	R	.056	R	2000	18.0	91.1	.8	.1	3.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 5.0 73 10.0
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 5.0 65 10.1
TWO CYCLE COMPOSITE -

HC- FID	0.35(	5.0) + 0.65(	5.0) =	9.976	G/KW	HP	(3.710 BS)
CO- NDIR	0.35(	22.6) + 0.65(	65.9) =	67.909	G/KW	HR	(50.640 BS)
NOx-CL	0.35(	10.0) + 0.65(	10.1) =	10.088	G/KW	HR	(7.523 BS)
			HC + NOX =	15.069	G/KW	HR	(11.233 BS)
			SFC =	.472	KG/KW	HR	(.776 BS)

TABLE B-8. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-105 RUN-03 CHEV. 350 BASELINE 03-29-76 K= 1.068 HUM= 14.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	2800	.900	11.72	50	12.931	1950	99	127	3	.232	11.3	29	.6	0.0	939
2 25 PCT T	390	.610	13.98	530	14.639	10206	31	869	131	.077	2.9	66	10.1	17.5	366
3 50 PCT T	830	1.300	13.98	1175	15.375	19970	89	2971	392	.197	13.1	363	57.6	38.3	231
4 25 PCT T	320	.470	14.12	530	14.824	10206	25	932	129	.077	1.9	72	10.0	17.9	368
5 10 PCT T	280	1.170	13.28	215	14.982	8079	19	1318	93	.057	1.0	75	2.9	6.8	939
6 25 PCT T	280	.580	14.12	590	14.732	10206	22	812	133	.077	1.7	62	10.2	17.4	373
7 50 PCT T	1080	1.990	13.56	1523	15.623	20912	161	5120	706	.113	18.2	579	79.7	63.3	63
8 25 PCT T	280	.690	14.12	530	14.792	10206	22	892	130	.077	1.7	69	10.0	17.6	366
9 C.T.	19080	.210	10.53	22	12.288	1950	296	67	1	.193	35.1	10	.2	0.0	605
1 IDLE	3760	.320	11.99	50	12.578	1950	45	100	3	.232	15.0	23	.6	0.0	939
2 25 PCT T	460	.990	14.12	580	14.662	10206	34	689	193	.077	2.8	53	11.0	17.6	366
3 50 PCT T	810	1.100	14.12	1250	15.312	19970	87	2100	919	.197	12.8	309	61.6	38.3	236
4 25 PCT T	390	.610	14.12	520	14.769	10206	27	852	127	.077	2.1	66	9.8	17.6	368
5 10 PCT T	350	1.230	13.29	205	14.550	8079	22	1379	90	.057	1.3	79	2.3	6.9	939
6 25 PCT T	320	.410	14.12	550	14.744	10206	25	852	135	.077	1.9	66	10.4	17.6	373
7 50 PCT T	1110	2.170	13.91	1937	15.707	20912	145	5496	662	.113	18.6	699	79.8	63.5	69
8 25 PCT T	280	.560	14.12	555	14.712	10206	22	785	137	.077	1.7	60	10.5	17.6	368
9 C.T.	15360	.270	10.09	32	12.093	1950	273	88	1	.193	39.0	13	.2	0.0	605

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- NV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.1	0.0	0	4.3	0	0	.057	0	600	17.7	13.1	2.2	.9	5.2	0.0
2 25 PCT T	19.9	23.4	62	22.5	.960	5.7	.066	.589	2000	15.2	2.7	5.0	5.6	9.0	7.2
3 50 PCT T	9.1	51.3	133	31.9	.621	7.8	.070	.378	2020	14.9	15.2	27.9	31.9	29.3	30.3
4 25 PCT T	19.5	23.9	61	22.5	.942	5.6	.067	.585	2000	15.0	2.2	5.9	5.5	9.0	7.2
5 10 PCT T	17.1	9.1	29	17.8	1.995	9.7	.066	1.183	2000	15.2	1.2	5.7	1.3	5.2	2.1
6 25 PCT T	19.7	23.6	61	22.5	.959	5.7	.066	.580	2020	15.1	2.0	4.7	5.6	9.0	7.3
7 50 PCT T	2.5	85.0	219	45.0	.530	8.9	.071	.322	2090	14.1	21.1	93.7	99.1	26.3	38.5
8 25 PCT T	19.9	23.6	61	22.5	.952	5.6	.067	.579	2020	15.0	2.0	5.2	5.5	9.0	7.3
9 C.T.	23.8	0.0	0	4.3	0	0	.057	0	2000	17.6	90.4	.7	.1	3.2	0.0
1 IDLE	17.1	0.0	0	4.3	0	0	.057	0	600	17.9	15.8	1.8	.9	5.2	0.0
2 25 PCT T	19.9	23.4	61	22.5	.959	6.2	.066	.580	2020	15.2	2.9	4.0	6.1	9.0	7.3
3 50 PCT T	9.3	51.3	133	31.9	.621	8.3	.069	.378	2020	14.5	13.5	23.5	34.0	29.3	30.2
4 25 PCT T	19.5	23.4	61	22.5	.959	5.5	.067	.580	2020	15.0	2.2	5.0	5.9	9.0	7.3
5 10 PCT T	17.1	9.2	29	17.8	1.926	9.9	.066	1.172	2020	15.2	1.3	4.0	1.3	5.2	2.1
6 25 PCT T	19.7	23.6	61	22.5	.952	5.8	.066	.579	2020	15.0	2.0	5.0	5.7	9.0	7.3
7 50 PCT T	2.7	86.1	219	45.0	.529	7.9	.072	.322	2090	14.0	19.4	99.1	91.3	26.3	38.5
8 25 PCT T	19.9	23.4	61	22.5	.954	5.9	.066	.580	2020	15.1	1.8	4.4	5.8	9.0	7.3
9 C.T.	23.8	0.0	0	4.3	0	0	.056	0	2000	17.9	90.9	1.0	.1	3.2	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 4.7 73 9.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 5.2 72 9.9

TWO CYCLE COMPOSITE - HC- FID 0.35(4.7) + 0.65(5.2) = 5.039 G/KW HR (3.758 BB)

CO- NDIR 0.35(72.5) + 0.65(71.4) = 71.865 G/KW HR (53.599 BB)

NOX-CL 0.35(9.9) + 0.65(9.9) = 9.899 G/KW HR (7.382 BB)

HC + NOX = 14.939 G/KW HR (11.140 BB)

SFC = .471 KG/KW HR (.775 BB)

TABLE B-9. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-1 TEST-103 RUN-1 CHEV. 350 BASELINE 03-22-76

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	452	1.8	18.1	3991	.270	11.47	53
2	1200	5.3	1	437	4.1	18.0	890	.160	11.96	108
3	1200	23.1	3	422	4.6	17.6	513	.160	12.35	155
4	1200	51.6	6	376	5.3	17.7	268	.210	12.21	240
5	1200	73.0	9	335	6.1	16.9	319	.210	12.89	350
6	1200	144.2	18	234	7.6	16.9	607	.640	12.74	840
7	1200	217.2	27	86	9.6	16.9	627	.270	12.74	1200
8	1200	236.8	30	76	10.7	16.3	388	.550	13.01	1400
9	1200	265.2	33	76	11.8	15.2	498	1.170	13.28	1725
10	1200	288.4	36	3	13.0	13.0	720	5.180	11.23	900
11	600	0.0	0	467	1.9	17.0	2458	.490	12.21	61
12	1200	0.0	0	569	2.0	17.2	56152	.430	5.74	11
13	2300	341.9	82	5	28.1	12.2	1923	6.570	10.54	825
14	2300	315.1	76	71	23.9	14.2	1256	1.790	13.56	1900
15	2300	279.5	67	107	22.0	15.1	959	.550	14.12	2325
16	2300	256.3	62	137	21.2	15.0	595	.760	13.98	1950
17	2300	170.9	41	259	16.1	14.8	592	.470	13.98	1325
18	2300	85.4	21	381	11.7	15.3	181	.490	13.98	610
19	2300	62.3	15	411	10.2	15.5	91	.380	13.98	430
20	2300	26.7	6	457	8.8	15.5	136	.730	13.56	230
21	2300	7.1	2	478	7.7	15.6	249	.880	13.28	155
22	600	0.0	0	452	1.8	17.7	3779	.320	11.72	99
23	2300	0.0	0	425	1.8	18.9	31029	.270	8.08	11

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	59.7	82	2.6	.070	0	9.0	R	R	R
2	30.1	109	12.1	.060	9	9.1	99.82	162.8	18.1
3	18.9	119	14.0	.060	17	10.2	6.50	90.9	6.5
4	11.9	181	34.0	.050	38	11.7	1.76	27.9	5.2
5	19.5	196	53.8	.030	59	13.9	1.58	21.9	5.9
6	34.9	733	158.1	.060	106	16.8	1.90	90.5	8.7
7	45.9	399	291.7	0.000	160	21.1	1.68	14.6	10.7
8	30.9	871	369.3	.040	175	23.5	1.02	29.3	12.2
9	80.9	1916	469.2	0.000	196	26.0	2.43	57.5	13.9
10	56.7	8236	235.2	0.000	213	28.6	1.56	227.3	6.5
11	36.2	196	3.0	.070	0	9.2	R	R	R
12	950.9	149	.6	.120	0	9.9	R	R	R
13	312.0	21537	999.5	.025	252	61.9	3.79	261.6	5.9
14	199.0	5585	979.9	.055	232	52.7	2.56	73.6	12.8
15	67.9	1661	1159.0	.035	206	98.5	1.01	24.7	17.1
16	78.3	2203	928.9	.060	189	96.6	1.27	35.7	15.0
17	63.7	2108	973.3	.060	126	35.6	1.55	51.2	11.5
18	19.6	796	163.0	0.000	63	25.7	.71	28.7	7.9
19	6.9	543	100.9	.065	96	22.9	.93	36.2	6.7
20	8.9	907	97.0	0.000	20	19.9	1.30	191.1	7.3
21	13.6	935	28.0	0.000	5	17.0	7.90	545.9	16.3
22	55.2	99	2.1	.080	0	9.0	R	R	R
23	991.5	86	.6	.060	0	9.0	R	R	R

CYCLE COMPOSITE	HC	10.183	GRAM/ KW HR	(7.593 BS)
	CO	71.769	GRAM/ KW HR	(53.518 BS)
	NOX	11.986	GRAM/ KW HR	(8.938 BS)
	SFC	.991	KG/ KW HR	(.725 BS)
CORRECTED	NOX	11.758	GRAM/ KW HR	(8.768 BS)

TABLE B-10. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-1 TEST-103 RUN-2 CHEV. 350 BASELINE 03-22-76

MODE	SPEED	TQ N-M	KW	HV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	992	1.8	18.1	3548	.290	11.97	71
2	1200	5.3	1	992	4.7	17.7	669	.210	12.21	118
3	1200	23.1	3	906	4.6	17.4	380	.180	12.47	162
4	1200	51.6	6	876	5.7	17.3	268	.210	12.50	280
5	1200	73.0	9	845	6.4	16.7	359	.430	12.74	370
6	1200	144.2	18	299	7.8	15.4	541	.790	13.01	850
7	1200	217.2	27	86	10.3	14.8	583	.320	12.74	1150
8	1200	236.8	30	76	10.7	14.1	744	.670	13.01	1425
9	1200	265.2	33	71	11.6	15.0	1067	1.300	13.28	1700
10	1200	288.4	36	3	13.4	12.7	1916	5.180	11.97	925
11	600	0.0	0	962	1.8	17.3	3121	.430	11.96	58
12	1200	17.8	2	569	2.0	17.8	50842	.430	5.97	11
13	2300	343.6	83	25	28.1	12.0	1444	6.670	10.76	950
14	2300	315.1	76	81	24.3	11.8	1919	6.880	10.76	330
15	2300	279.5	67	97	21.1	14.4	614	.730	14.12	2325
16	2300	256.3	62	132	20.8	14.7	661	.910	14.12	2125
17	2300	170.4	41	259	16.1	14.4	731	1.230	14.12	1350
18	2300	85.4	21	381	11.8	15.0	250	.670	14.12	670
19	2300	62.3	15	411	10.3	15.2	136	.440	14.12	510
20	2300	26.7	6	472	8.7	15.0	102	.410	13.83	260
21	2300	7.1	2	478	7.8	15.5	244	.470	13.28	180
22	600	0.0	0	952	1.8	17.7	3334	.320	11.72	53
23	2300	0.0	0	625	1.8	18.4	27667	.270	8.96	16

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	53.1	88	3.5	.070	0	4.0	R	R	R
2	25.0	159	14.7	.060	4	10.3	37.24	236.5	21.8
3	13.7	131	14.5	.060	17	10.1	4.72	45.1	4.7
4	11.4	184	41.4	.050	38	12.5	1.84	29.1	6.4
5	17.3	418	54.1	.030	54	14.0	1.88	45.5	6.4
6	30.3	893	158.0	.060	106	17.1	1.67	49.3	8.7
7	45.4	510	301.0	0.000	160	22.8	1.68	18.7	11.0
8	57.4	1053	368.2	.040	175	23.6	1.94	35.4	12.4
9	69.3	2076	446.2	0.000	196	25.6	2.53	62.3	13.4
10	152.7	8342	249.8	0.000	213	29.6	4.21	230.2	6.8
11	44.6	124	2.8	.070	0	4.0	R	R	R
12	883.6	151	.6	.120	13	4.4	344.47	67.5	.3
13	312.3	21263	505.3	.025	253	61.4	3.77	256.4	6.1
14	261.2	18913	144.1	.055	232	53.5	3.44	244.2	2.0
15	86.4	2086	1041.4	.035	206	46.5	1.24	31.0	16.2
16	90.4	2530	970.4	.060	184	45.8	1.47	41.0	15.7
17	76.3	2544	468.0	.060	126	35.5	1.85	63.0	11.4
18	20.0	1082	177.8	0.000	63	26.1	.47	52.5	8.6
19	4.6	700	114.7	.065	46	22.8	.64	46.6	8.0
20	10.7	1085	50.4	0.000	20	14.2	1.67	168.7	7.4
21	14.2	1077	32.8	0.000	5	17.3	4.43	427.8	14.1
22	48.4	45	2.4	.080	0	4.0	R	R	R
23	436.6	86	.8	.060	0	4.0	R	R	R

CYCLE COMPOSITE HC 4.756 GRAM/ KW HR (7.275 83)
CO 114.005 GRAM/ KW HR (85.014 83)
NOx 4.631 GRAM/ KW HR (7.182 83)
SFC .436 KG/ KW HR (.717 83)
CORRECTED NOX 8.462 GRAM/ KW HR (6.683 83)

TABLE B-11. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-1 TEST-103 RUN-3 CHEV. 350 BASELINE 03-22-76

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	997	1.8	17.5	2895	.550	11.72	52
2	1200	3.6	0	992	4.5	18.1	556	.130	11.96	113
3	1200	23.1	3	911	4.8	17.6	335	.160	12.35	158
4	1200	51.6	6	371	5.7	17.1	269	.320	12.60	285
5	1200	73.0	9	390	6.1	16.8	336	.380	12.74	380
6	1200	199.2	18	239	8.0	16.0	659	.730	13.01	850
7	1200	217.2	27	97	10.3	16.9	672	.270	12.74	1275
8	1200	236.8	30	76	11.1	15.9	699	.670	13.14	1525
9	1200	265.2	33	76	11.9	14.9	1113	1.370	13.28	1700
10	1200	289.8	36	3	14.0	12.7	2008	5.180	11.47	900
11	600	0.0	0	957	1.9	17.6	3337	.930	11.72	50
12	1200	17.8	2	569	2.0	17.0	55587	.930	5.97	11
13	2300	391.8	82	30	28.1	12.1	1739	6.570	10.65	1075
14	2300	315.1	76	76	29.1	12.4	1809	6.270	10.65	960
15	2300	279.5	67	86	21.4	15.2	931	.990	14.12	2925
16	2300	256.3	62	127	20.5	15.1	500	.670	13.93	2225
17	2300	170.9	41	259	15.9	14.8	978	.910	13.98	1925
18	2300	85.9	21	376	11.6	15.2	363	.990	14.12	690
19	2300	69.1	15	901	10.3	15.5	91	.320	13.98	590
20	2300	24.7	6	957	8.5	15.5	159	.730	13.56	270
21	2300	7.1	2	978	7.6	14.1	315	.990	12.87	175
22	600	0.0	0	997	1.8	18.1	3991	.270	11.97	53
23	2300	0.0	0	620	1.8	18.8	30961	.210	7.90	16

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	41.8	160	2.5	.070	0	9.0	R	R	R
2	20.6	97	13.9	.060	3	9.9	95.99	217.0	31.0
3	12.7	123	19.9	.060	17	10.5	9.37	92.2	6.8
4	11.8	283	91.9	.050	38	12.5	1.81	93.6	6.9
5	15.7	357	58.7	.030	59	13.5	1.71	39.0	6.9
6	38.0	858	169.1	.060	106	17.7	2.10	97.3	9.1
7	53.2	931	339.8	0.000	160	22.8	1.95	15.8	12.3
8	56.0	1084	405.9	.090	175	24.5	1.88	36.9	13.6
9	89.6	2228	459.9	0.000	196	26.2	2.69	66.8	13.6
10	167.0	8703	298.5	0.000	210	30.9	9.67	243.2	6.9
11	99.7	129	2.5	.070	0	9.1	R	R	R
12	927.7	195	.6	.120	13	9.9	914.70	69.8	.3
13	281.2	21958	577.1	.025	252	62.0	3.92	260.6	7.0
14	259.1	17839	215.1	.055	232	53.1	3.35	235.1	2.8
15	63.7	1962	1188.8	.035	206	47.7	.95	21.7	17.7
16	69.7	1988	1030.3	.060	189	45.2	1.13	30.6	16.7
17	50.9	1459	509.3	.060	126	35.1	1.29	97.6	12.3
18	28.7	782	180.9	0.000	63	25.5	1.39	38.0	8.8
19	6.5	965	129.0	.065	47	22.7	.92	30.1	8.4
20	9.9	879	53.9	0.000	20	18.8	1.47	136.7	8.3
21	17.9	883	32.1	0.000	5	16.7	10.17	519.8	18.7
22	59.7	82	2.6	.080	0	9.0	R	R	R
23	501.3	69	.9	.060	0	9.0	R	R	R

CYCLE COMPOSITE	HC	9.996	GRAM/ KW HR	(7.959 BS)
	CO	105.217	GRAM/ KW HR	(78.961 BS)
	NOX	10.513	GRAM/ KW HR	(7.889 BS)
	SFC	.936	KG/ KW HR	(.717 BS)
CORRECTED NOX		9.701	GRAM/ KW HR	(7.239 BS)

TABLE B-12. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-104 RUN-2 03-23-76 CHEV. 350 BASELINE K= .965 HUM= 9.7 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	1720	6.570	10.59	775	17.389	27306	319	20936	986	319.3	20936	391.5	71.1	15
2	2700	520	.880	14.12	1925	15.059	24903	96	2881	1036	96.0	2881	998.9	70.2	152
3	2700	990	1.090	14.12	950	15.214	15876	58	2142	329	58.3	2142	317.9	34.1	330
4	1100	290	.270	12.47	270	12.767	5171	11	221	36	10.9	221	35.0	5.5	356
5	1100	13600	.290	9.66	99	11.385	2948	389	126	9	389.5	126	3.6	0.0	983
6	1100	96720	.380	5.89	12	11.213	1905	840	130	1	839.8	130	.7	0.0	556

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOx	SFC KG/KW HR
1		.6	95.3	250	60.2	3.27	218.09	9.23	.631	12.2	.082	9.39	292.96	5.67	.389
2		6.0	99.1	183	53.8	1.02	30.98	10.96	.572	14.7	.068	1.36	90.88	19.70	.348
3		13.0	95.7	88	35.0	1.27	97.75	7.17	.766	14.6	.069	1.70	69.09	9.61	.466
4		19.0	7.9	35	11.9	1.96	29.75	9.89	1.592	17.3	.058	1.96	39.90	6.56	.938
5		19.0	0.0	0	6.5	R	R	R	R	18.9	.053	R	R	R	R
6		21.9	0.0	0	9.2	R	R	R	R	18.2	.055	R	R	R	R

ID =

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-104 RUN-3 03-23-76 CHEV. 350 BASELINE K= .976 HUM= 9.7 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	1700	6.570	10.45	900	17.417	26993	305	20530	962	309.9	20530	951.9	70.1	15
2	2700	490	.820	14.12	1975	14.995	24080	88	2456	1051	87.6	2456	1026.6	70.1	152
3	2700	960	1.100	14.12	975	15.272	16057	55	2336	340	55.2	2336	332.3	35.5	330
4	1100	29[illegible]	.270	12.47	280	12.767	5262	11	225	38	11.1	225	37.9	6.1	356
5	1100	14080	.290	9.66	39	11.937	2903	390	123	3	390.1	123	3.2	0.0	983
6	1100	96720	.380	6.05	12	11.380	1905	829	129	1	828.7	129	.7	0.0	556

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOx	SFC KG/KW HR
1		.6	93.9	247	59.9	3.23	217.25	9.89	.633	12.1	.083	9.33	291.34	6.56	.385
2		6.0	99.0	183	53.0	.93	28.10	11.12	.564	14.8	.068	1.24	37.69	19.92	.343
3		13.0	97.6	93	35.9	1.15	88.75	7.10	.788	14.5	.069	1.54	65.37	9.52	.952
4		19.0	8.2	39	11.6	1.34	27.25	9.49	1.912	17.3	.058	1.80	36.59	6.23	.859
5		19.0	0.0	0	6.9	R	R	R	R	18.8	.053	R	R	R	R
6		21.9	0.0	0	9.2	R	R	R	R	18.0	.056	R	R	R	R

ID =

TABLE B-13. MASS EMISSIONS BY NINE-MODE FTP -METRIC UNITS

ENGINE-1 TEST-106 RUN-1 BASELINE CARB. 6607 05-18-76 K = .967 HUM = 9.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NO2	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NO2-CL	KW	HP
1 IDLE	9386	.125	10.30	96	10.869	1951	79	95	3	.232	18.3	11	.6	0	0
2 16 HG	271	.312	13.78	350	19.119	8709	17	389	72	.077	1.3	30	5.5	11	19
3 10 HG	692	.350	19.23	1277	19.699	13699	65	661	396	.197	9.5	97	58.3	35	96
4 16 HG	305	.389	13.78	330	19.199	8709	19	481	67	.077	1.9	37	5.2	11	19
5 19 HG	896	.193	12.79	115	13.072	6991	99	192	19	.057	2.5	11	1.1	0	0
6 16 HG	260	.363	13.93	350	19.319	8709	16	495	71	.077	1.2	39	5.9	11	19
7 3 HG	566	.159	19.08	2109	19.295	18779	79	921	918	.113	8.9	98	103.7	57	76
8 16 HG	227	.902	19.08	370	19.509	8709	19	987	79	.077	1.0	38	5.7	11	19
9 C.T.	15356	.159	9.69	22	11.339	1951	269	55	1	.193	37.8	8	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.5	21	12.5		
1 IDLE	9983	.120	10.76	99	11.320	1951	76	92	3	.232	17.6	10	.6	0	0
2 16 HG	373	.915	13.69	1000	19.092	8709	23	518	205	.077	1.8	90	15.8	11	19
3 10 HG	670	.376	19.23	1335	19.672	13699	63	708	919	.197	9.2	109	60.8	35	96
4 16 HG	299	.389	13.93	365	19.398	8709	18	976	79	.077	1.9	37	5.7	11	19
5 19 HG	828	.216	12.65	119	12.999	6991	91	217	18	.057	2.3	12	1.0	0	0
6 16 HG	299	.902	13.93	360	19.361	8709	18	992	72	.077	1.9	38	5.6	11	19
7 3 HG	593	.159	19.08	2099	19.293	18779	71	921	913	.113	8.1	98	103.2	57	76
8 16 HG	215	.376	13.93	370	19.327	8709	13	961	75	.077	1.0	36	5.7	11	19
9 C.T.	16727	.193	9.93	21	11.295	1951	289	67	1	.193	91.3	10	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.7	22	13.9		
1 IDLE	9975	.131	11.12	96	11.698	1951	67	99	3	.232	15.9	10	.6	0	0
2 16 HG	997	.376	13.69	355	19.065	8709	31	970	73	.077	2.9	36	5.6	11	19
3 10 HG	680	.902	19.08	1396	19.550	13699	64	769	921	.197	9.9	112	61.8	35	96
4 16 HG	317	.902	13.93	380	19.363	8709	19	992	76	.077	1.5	38	5.9	11	19
5 19 HG	673	.193	12.93	120	13.190	6991	33	190	19	.057	1.9	11	1.1	0	0
6 16 HG	283	.902	13.78	360	19.210	8709	17	997	73	.077	1.3	38	5.6	11	19
7 3 HG	588	.153	19.08	2113	19.292	18779	77	906	922	.113	8.7	96	104.2	57	76
8 16 HG	299	.363	13.93	365	19.318	8709	15	996	79	.077	1.2	39	5.7	11	19
9 C.T.	16030	.193	9.93	21	11.226	1951	279	68	1	.193	39.8	10	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.5	23	12.9		
1 IDLE	9199	.120	11.29	99	11.780	1951	70	90	3	.232	16.1	9	.6	0	0
2 16 HG	576	.915	13.69	390	19.113	8709	36	517	70	.077	2.7	90	5.9	11	19
3 10 HG	697	.902	19.23	1396	19.696	13699	60	756	917	.197	8.9	111	61.2	35	96
4 16 HG	339	.915	13.78	370	19.229	8709	21	513	75	.077	1.6	98	5.8	11	19
5 19 HG	785	.216	12.93	125	13.229	6991	38	212	20	.057	2.2	12	1.2	0	0
6 16 HG	299	.363	13.78	370	19.172	8709	18	950	75	.077	1.9	35	5.8	11	19
7 3 HG	317	.170	19.08	2085	19.282	18779	92	951	910	.113	9.7	51	102.9	57	76
8 16 HG	227	.376	19.08	375	19.478	8709	19	956	75	.077	1.1	35	5.8	11	19
9 C.T.	17393	.193	9.22	21	11.152	1951	309	68	1	.193	93.5	10	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.5	23	12.7		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)----------											5.6	22	13.0		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 4)----------											5.5	23	12.8		

FOUR CYCLE COMPOSITE -

HC- FID 0.35(5.6) + 0.65(5.5) = 5.549 G/ KW HR (9.139 GM)

CO- NDIR 0.35(21.0) + 0.65(22.9) = 22.983 G/ KW HR (16.765 GM)

NO2-CL 0.35(13.0) + 0.65(12.8) = 12.850 G/ KW HR (9.582 GM)

CORRECTED NO2 = 12.921 G/ KW HR (9.262 GM)

SFC = .539 KG/ KW HR (.878 GM)

TABLE B-14. MASS EMISSIONS BY NINE-MODE FTP -METRIC UNITS

ENGINE-1 TEST-106 RUN-2 BASELINE CARB. 6607 05-18-76 K = .955 HUM = 8.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NO2	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NO2-CL	KW	HP
1 IDLE	9902	.115	10.76	91	11.315	1951	76	90	2	.232	17.6	9	.5	0	0
2 16 HG	593	.350	13.78	315	14.184	8845	34	991	65	.077	2.6	34	5.0	11	14
3 10 HG	660	.300	14.54	1335	14.906	13744	61	558	909	.147	8.9	82	60.1	35	46
4 16 HG	241	.350	14.08	360	14.456	8845	16	932	73	.077	1.2	33	5.6	11	14
5 14 HG	450	.204	13.21	110	13.454	6350	21	145	17	.057	1.2	11	1.0	0	0
6 16 HG	215	.337	13.93	350	14.284	8845	13	922	72	.077	1.0	32	5.5	11	14
7 3 HG	295	.147	14.23	2047	14.407	18774	38	388	886	.113	4.3	44	100.1	57	76
8 16 HG	102	.337	14.23	370	14.585	8845	11	913	74	.077	.8	32	5.7	11	14
9 C.T.	18121	.143	9.93	17	11.435	1905	202	65	1	.143	93.2	9	.1	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.4	14	12.4		
1 IDLE	9925	.125	11.36	99	11.928	1951	72	91	2	.232	16.8	10	.6	0	0
2 16 HG	725	.363	13.93	360	14.365	8845	45	951	72	.077	3.4	35	5.5	11	14
3 10 HG	660	.350	14.54	1346	14.956	13744	61	644	911	.147	8.9	95	60.4	35	46
4 16 HG	283	.376	13.93	365	14.339	8845	17	968	75	.077	1.3	36	5.8	11	14
5 14 HG	450	.143	13.21	120	13.448	6350	21	184	19	.057	1.2	10	1.1	0	0
6 16 HG	227	.337	14.08	375	14.440	8845	14	917	76	.077	1.1	32	5.4	11	14
7 3 HG	544	.147	14.23	2113	14.432	18774	71	388	913	.113	8.0	44	103.1	57	76
8 16 HG	227	.350	14.23	380	14.602	8845	14	928	76	.077	1.1	33	5.4	11	14
9 C.T.	18818	.143	9.93	14	11.504	1905	312	64	1	.143	44.6	9	.1	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.8	20	12.7		
1 IDLE	9588	.125	11.00	95	11.584	1951	77	93	3	.232	17.4	10	.6	0	0
2 16 HG	612	.363	14.08	340	14.504	8845	37	947	69	.077	2.4	34	5.3	11	14
3 10 HG	637	.337	14.54	1346	14.941	13744	54	626	911	.147	8.6	92	60.4	35	46
4 16 HG	283	.376	14.08	370	14.484	8845	17	963	75	.077	1.3	36	5.8	11	14
5 14 HG	354	.204	12.93	105	13.170	6350	17	144	17	.057	1.0	11	1.0	0	0
6 16 HG	226	.376	13.93	370	14.328	8845	14	968	76	.077	1.1	36	5.8	11	14
7 3 HG	295	.142	14.23	2186	14.901	18774	38	374	996	.113	4.3	42	106.4	57	76
8 16 HG	143	.312	14.23	900	14.561	8845	12	383	81	.077	.4	24	6.2	11	14
9 C.T.	16757	.143	9.64	14	11.508	1905	277	64	1	.143	39.7	9	.1	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.2	20	12.4		
1 IDLE	9916	.120	11.12	99	11.682	1951	74	90	2	.232	17.1	9	.6	0	0
2 16 HG	509	.363	13.93	340	14.344	8845	31	952	70	.077	2.4	35	5.4	11	14
3 10 HG	619	.350	14.54	1358	14.951	13744	56	650	914	.147	8.3	96	60.4	35	46
4 16 HG	317	.384	14.08	355	14.500	8845	19	979	72	.077	1.5	37	5.5	11	14
5 14 HG	359	.181	13.07	120	13.287	6350	17	175	19	.057	1.0	10	1.1	0	0
6 16 HG	238	.312	14.23	370	14.566	8845	14	383	75	.077	1.1	29	5.7	11	14
7 3 HG	521	.147	14.23	2075	14.930	18774	68	388	892	.113	7.7	44	101.3	57	76
8 16 HG	209	.337	14.08	385	14.438	8845	12	917	78	.077	1.0	32	6.0	11	14
9 C.T.	15729	.143	9.75	14	11.515	1905	260	64	1	.143	37.2	9	.1	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.2	20	12.6		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)----------											5.6	20	12.5		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 9)----------											5.2	20	12.7		

FOUR CYCLE COMPOSITE -

HC- FID 0.35(5.6) + 0.65(5.2) = 5.355 G/ KW HR (3.993 BS)

CO- NDIR 0.35(19.9) + 0.65(20.2) = 20.101 G/ KW HR (14.989 BS)

NO2-CL 0.35(12.5) + 0.65(12.7) = 12.657 G/ KW HR (9.438 BS)

CORRECTED NO2 = 12.082 G/ KW HR (9.009 BS)

BFC = .535 KG/ KW HR (.879 BS)

TABLE B-15. MASS EMISSIONS BY NINE-MODE FTP -METRIC UNITS

ENGINE-1 TEST-106 RUN-3 CARB. 6607 BASELINE 05-18-76 K = .937 HUM = 8.2 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NO2	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NO2-CL	KW	HP
1 IDLE	9907	.125	10.88	99	11.996	1905	73	92	2	.232	17.0	10	.6	0	0
2 16 MG	837	.928	13.78	390	19.292	8936	52	591	71	.077	9.0	92	5.9	11	19
3 10 MG	590	.389	19.23	1396	19.678	13789	55	737	920	.197	8.2	108	61.7	35	96
9 16 MG	227	.902	13.93	360	19.359	8936	19	505	79	.077	1.1	39	5.7	11	19
5 19 MG	769	.216	13.07	120	13.362	6219	36	203	19	.057	2.0	12	1.1	0	0
6 16 MG	227	.983	13.93	380	19.936	8936	19	609	78	.077	1.1	96	6.0	11	19
7 3 MG	999	.209	19.23	2066	19.989	18739	65	533	887	.113	7.3	60	100.3	57	76
8 16 MG	181	.928	13.93	160	19.376	8936	11	538	33	.077	.9	91	2.5	11	19
9 C.T.	16726	.181	9.93	21	11.289	1905	282	62	1	.193	90.9	9	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.5	25	12.3		
1 IDLE	9903	.125	10.76	99	11.326	1905	79	93	2	.232	17.2	10	.6	0	0
2 16 MG	792	.928	13.78	360	19.287	8936	50	591	75	.077	3.8	92	5.8	11	19
3 10 MG	659	.928	19.23	1369	19.729	13789	62	810	926	.197	9.1	119	62.6	35	96
9 16 MG	272	.992	13.93	360	19.399	8936	17	559	79	.077	1.3	93	5.7	11	19
5 19 MG	790	.215	12.93	130	13.219	6219	35	209	20	.057	2.0	12	1.2	0	0
6 16 MG	227	.928	13.93	380	19.381	8936	19	538	78	.077	1.1	91	6.0	11	19
7 3 MG	976	.159	19.23	2066	19.936	18739	62	916	890	.113	7.0	97	100.6	57	76
8 16 MG	209	.902	13.93	170	19.352	8936	13	505	35	.077	1.0	39	2.7	11	19
9 C.T.	16699	.209	9.22	20	11.099	1905	287	71	1	.193	91.0	10	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.6	29	12.5		
1 IDLE	3799	.120	11.00	93	11.999	1905	63	90	2	.232	19.6	9	.5	0	0
2 16 MG	610	.928	13.69	360	19.129	8936	39	597	76	.077	3.0	92	5.8	11	19
3 10 MG	697	.902	19.23	1357	19.696	13789	61	761	923	.197	8.9	112	62.1	35	96
9 16 MG	272	.902	13.93	380	19.359	8936	17	505	79	.077	1.3	39	6.0	11	19
5 19 MG	359	.263	12.93	110	13.229	6219	17	250	17	.057	1.0	19	1.0	0	0
6 16 MG	299	.983	13.93	380	19.938	8936	15	609	78	.077	1.2	96	6.0	11	19
7 3 MG	510	.181	19.23	2096	19.962	18739	66	979	880	.113	7.5	59	99.9	57	76
8 16 MG	193	.928	13.93	390	19.378	8936	12	538	80	.077	.9	91	6.2	11	19
9 C.T.	16727	.193	9.93	21	11.295	1905	282	66	1	.193	90.3	9	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.3	25	12.6		
1 IDLE	9898	.125	10.88	92	11.990	1905	80	92	2	.232	18.6	10	.5	0	0
2 16 MG	593	.902	13.78	370	19.236	8936	39	509	77	.077	2.6	39	5.9	11	19
3 10 MG	625	.992	19.39	1396	19.899	13789	58	826	919	.197	8.5	121	60.8	35	96
9 16 MG	295	.928	13.93	370	19.388	8936	18	537	76	.077	1.9	91	5.9	11	19
5 19 MG	381	.193	12.93	120	13.161	6219	18	189	19	.057	1.0	10	1.1	0	0
6 16 MG	299	.902	12.93	370	19.357	8936	16	505	76	.077	1.2	39	5.9	11	19
7 3 MG	521	.193	19.23	2096	19.975	18739	67	509	879	.113	7.6	57	99.3	57	76
8 16 MG	209	.992	13.93	390	19.392	8936	13	559	80	.077	1.0	93	6.2	11	19
9 C.T.	16030	.193	9.93	21	11.226	1905	272	66	1	.193	38.9	9	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.9	25	12.5		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)----------											5.6	25	12.9		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 9)----------											5.9	25	12.5		

FOUR CYCLE COMPOSITE -

HC- FID	0.35(5.6) + 0.65(5.9) =	5.932	G/ KW HR	(9.051 GB)	
CO- NDIR	0.35(29.5) + 0.65(29.8) =	29.698	G/ KW HR	(18.917 GB)	
NO2-CL	0.35(12.9) + 0.65(12.5) =	12.992	G/ KW HR	(9.315 GB)	
	CORRECTED NO2 =	11.711	G/ KW HR	(8.733 GB)	
	SFC =	.535	KG/ KW HR	(.880 GB)	

TABLE B-16. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-107 RUN-01 BASELINE CARB. 6607 05-19-76 K= .996 HUM= 8.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CRN	VAC. MM
1 IDLE	9000	.115	10.76	90	11.315	1860	72	38	2	.232	16.8	9	.5	8.8	911
2 25 PCT T	260	.239	13.78	530	14.099	10978	22	360	129	.077	1.7	28	9.6	17.6	351
3 55 PCT T	480	.350	14.39	1960	14.798	19923	55	713	962	.197	8.1	105	68.8	38.4	221
4 25 PCT T	180	.239	13.93	575	14.190	10387	15	359	132	.077	1.1	27	10.2	17.6	351
5 10 PCT T	180	.997	13.93	220	14.997	8029	11	558	38	.057	.6	32	2.2	7.1	922
6 25 PCT T	150	.239	13.93	570	14.187	10933	13	355	132	.077	1.0	27	10.1	17.6	351
7 90 PCT T	990	1.350	14.23	1723	15.688	20820	193	3619	718	.113	16.1	909	81.1	63.9	69
8 25 PCT T	190	.251	14.08	580	14.397	10251	11	362	130	.077	.9	28	10.8	17.6	351
9 C.T.	13990	.181	8.81	21	10.997	1996	278	70	1	.193	39.8	10	.2	0.0	602
1 IDLE	3600	.125	11.00	95	11.522	1950	67	93	2	.232	15.6	10	.6	0.0	911
2 25 PCT T	380	.251	13.78	520	14.079	10523	32	329	122	.077	2.5	29	9.9	17.6	351
3 55 PCT T	520	.376	14.39	1960	14.825	19878	59	761	960	.197	8.7	112	67.6	38.6	221
4 25 PCT T	210	.251	13.93	530	14.205	10342	17	369	121	.077	1.3	28	9.3	17.6	351
5 10 PCT T	190	.337	13.78	220	14.137	7983	11	385	39	.057	.7	22	2.2	7.1	927
6 25 PCT T	190	.251	13.93	530	14.203	10933	16	373	122	.077	1.2	29	9.9	17.6	359
7 90 PCT T	960	1.350	14.23	1723	15.690	20689	195	3595	713	.113	16.9	986	80.6	63.3	69
8 25 PCT T	160	.251	13.93	590	14.199	10933	13	373	136	.077	1.0	29	10.5	17.6	351
9 C.T.	19720	.193	9.01	26	10.800	1950	288	70	1	.193	91.3	10	.2	0.0	602

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 IDLE	16.2	0.0	0	9.1	R	R	.052	R	600	19.3	19.5	1.3	.2	9.R	0.0
2 25 PCT T	13.9	23.6	62	23.1	.978	5.3	.063	.595	2000	15.R	2.0	9.1	5.0	9.0	7.3
3 55 PCT T	8.7	51.7	136	32.9	.636	9.0	.066	.387	2000	15.0	9.9	15.5	35.9	29.6	30.9
4 25 PCT T	13.8	23.6	62	22.9	.969	5.6	.069	.590	2000	15.7	1.3	9.0	5.3	9.0	7.3
5 10 PCT T	16.6	9.6	25	17.7	1.853	9.0	.065	1.127	2000	15.9	.8	9.7	1.1	5.1	2.2
6 25 PCT T	13.8	23.4	62	23.0	.973	5.6	.069	.592	2000	15.7	1.2	9.1	5.3	9.0	7.3
7 90 PCT T	2.7	R5.0	223	95.9	.590	8.5	.071	.328	2000	19.1	18.7	60.6	92.3	26.9	38.9
8 25 PCT T	13.R	23.4	62	22.6	.956	5.5	.065	.581	2000	15.5	1.0	9.1	5.2	8.R	7.3
9 C.T.	23.7	0.0	0	9.9	R	R	.099	R	2000	20.5	96.2	1.5	.1	3.2	0.0
1 IDLE	16.2	0.0	0	9.3	R	R	.053	R	600	19.0	17.6	1.5	.3	5.1	0.0
2 25 PCT T	13.R	23.6	62	23.2	.982	5.2	.063	.597	2000	15.R	2.R	9.3	5.0	9.1	7.3
3 55 PCT T	8.7	51.8	134	32.8	.633	R.9	.067	.385	2000	15.0	9.8	16.6	35.6	29.5	30.9
4 25 PCT T	13.R	23.4	62	22.R	.965	5.2	.064	.587	2000	15.6	1.5	9.2	9.9	R.9	7.3
5 10 PCT T	16.R	9.6	25	17.6	1.843	9.1	.069	1.121	2000	15.7	.7	3.2	1.2	5.1	2.2
6 25 PCT T	13.9	23.6	62	23.0	.973	5.2	.064	.592	2000	15.6	1.9	9.2	5.0	9.0	7.3
7 90 PCT T	2.7	89.9	223	95.6	.537	R.9	.071	.327	2000	19.1	18.5	60.2	92.5	26.2	38.3
8 25 PCT T	13.R	23.6	62	23.0	.973	5.R	.069	.592	2000	15.7	1.2	9.3	5.5	9.0	7.3
9 C.T.	23.7	0.0	0	9.3	R	R	.050	R	2000	19.R	96.5	1.5	.1	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 9.6 36 10.3

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 9.8 36 10.2

TWO CYCLE COMPOSITE -

HC- FID 0.35(9.6) + 0.65(9.R) = 9.727 G/KW HR (3.525 BS)

CO- NDIR 0.35(36.3) + 0.65(36.9) = 36.350 G/KW HR (27.106 BS)

NOX-CL 0.35(10.3) + 0.65(10.2) = 10.269 G/KW HR (7.659 BS)

HC + NOX = 19.990 G/KW HR (11.178 BS)

SFC = .978 KG/KW HR (.786 BS)

TABLE B-17. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HO ENGINE---PROJECT 11-9311

ENGINE-01 TEST-107 RUN-02 BASELINE CARB. 6607 05-19-76 K= .923 HUM= 7.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	9250	.125	10.76	40	11.352	1860	76	91	2	.232	17.7	10	.5	0.0	911
2 25 PCT T	350	.263	14.08	540	14.383	10705	30	396	128	.077	2.3	30	9.8	17.6	353
3 55 PCT T	520	.399	14.54	1505	14.993	15105	60	701	966	.197	8.8	103	68.5	38.5	221
4 25 PCT T	200	.275	13.93	590	14.228	10387	17	904	132	.077	1.3	31	10.2	17.4	351
5 10 PCT T	180	.902	13.93	300	14.352	8079	11	956	52	.057	.7	26	2.9	7.1	927
6 25 PCT T	170	.263	13.93	600	14.212	10933	19	390	135	.077	1.1	30	10.9	17.6	353
7 90 PCT T	960	1.373	14.23	1749	15.713	20729	195	3658	705	.113	16.9	913	79.7	63.3	69
8 25 PCT T	130	.251	14.08	595	14.396	10297	11	364	131	.077	.8	28	10.1	17.6	353
9 C.T.	13120	.181	9.75	21	11.344	1860	239	60	1	.193	33.5	9	.2	0.0	605
1 IDLE	9320	.120	10.88	43	11.476	1860	77	39	2	.232	17.9	9	.5	0.0	906
2 25 PCT T	290	.312	13.93	585	14.269	10933	20	961	131	.077	1.5	35	10.1	17.6	353
3 55 PCT T	510	.389	14.54	1494	14.987	14969	58	784	957	.197	8.5	115	67.2	38.6	229
4 25 PCT T	200	.275	13.93	590	14.228	10392	16	904	131	.077	1.3	31	10.1	17.6	351
5 10 PCT T	160	.992	13.93	280	14.390	7983	10	995	98	.057	.6	28	2.7	7.1	927
6 25 PCT T	170	.251	14.08	610	14.350	10392	19	346	135	.077	1.1	28	10.9	17.6	353
7 90 PCT T	900	.216	14.39	2028	14.451	20912	63	607	866	.113	7.1	69	97.8	63.9	71
8 25 PCT T	150	.300	14.08	620	14.397	10297	12	933	136	.077	.9	33	10.5	17.7	351
9 C.T.	12800	.159	9.75	21	11.304	1860	230	53	1	.193	32.9	8	.2	0.0	605

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	16.2	0.0	0	9.1	R	R	.052	R	600	19.2	21.5	1.9	.2	9.8	0.0
2 25 PCT T	13.9	23.6	42	23.6	1.000	5.9	.065	.608	2000	15.5	2.8	9.5	5.1	9.2	7.3
3 55 PCT T	8.7	51.7	134	33.3	.644	9.1	.067	.392	2000	19.9	10.7	15.2	35.6	29.8	30.9
4 25 PCT T	13.8	23.6	42	22.9	.971	5.6	.064	.591	2000	15.6	1.5	9.6	5.3	8.9	7.3
5 10 PCT T	16.8	9.5	25	17.8	1.865	5.9	.065	1.135	2000	15.5	.8	3.8	1.5	5.1	2.2
6 25 PCT T	13.9	23.6	42	23.0	.974	5.7	.064	.593	2000	15.6	1.3	9.9	5.9	9.0	7.3
7 90 PCT T	2.7	84.9	223	95.7	.638	8.3	.071	.328	2000	19.1	19.8	60.7	91.9	26.2	38.9
8 25 PCT T	13.9	23.6	42	22.7	.962	5.6	.064	.585	2000	15.5	1.0	9.1	5.2	8.9	7.3
9 C.T.	23.8	0.0	0	9.1	R	R	.053	R	2000	19.0	90.6	1.3	.1	3.0	0.0
1 IDLE	16.0	0.0	0	9.1	R	R	.053	R	600	19.0	29.9	2.6	.2	9.9	0.0
2 25 PCT T	13.9	23.6	42	23.0	.973	5.6	.064	.592	2000	15.6	2.1	9.9	9.8	9.1	7.3
3 55 PCT T	8.8	51.8	134	33.0	.637	8.9	.067	.388	2000	19.9	11.9	32.3	32.1	29.9	30.9
4 25 PCT T	13.8	23.6	42	22.8	.964	5.6	.064	.586	2000	15.6	1.8	8.7	9.8	9.0	7.3
5 10 PCT T	16.8	9.6	25	17.6	1.843	5.0	.065	1.121	2000	15.9	.8	7.9	1.3	5.1	2.2
6 25 PCT T	13.9	23.6	42	22.8	.964	5.7	.065	.586	2000	15.5	1.5	7.9	5.0	9.0	7.3
7 90 PCT T	2.8	85.0	223	95.0	.529	10.2	.066	.322	2000	15.2	10.0	19.2	96.7	26.1	38.9
8 25 PCT T	13.8	23.7	42	22.7	.959	5.8	.065	.583	2000	15.9	1.3	9.3	5.0	9.0	7.3
9 C.T.	23.8	0.0	0	9.1	R	R	.052	R	2000	19.1	95.8	2.1	.1	3.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 9.9 37 10.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 3.9 19 11.3

TWO CYCLE COMPOSITE -

HC- FID	0.35(9.9) + 0.65(3.9) =	4.870	G/KW HR	(3.035 GS)
CO- NDIR	0.35(34.6) + 0.65(19.2) =	25.318	G/KW HR	(18.880 GS)
NOx-CL	0.35(10.9) + 0.65(11.3) =	10.956	G/KW HR	(8.170 GS)
HC + NOX =		15.825	G/KW HR	(11.209 GS)
SFC =		.426	KG/KW HR	(.782 GS)

TABLE B-18. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-107 RUN-03 BASELINE CARB. 4607 05-19-76 K= .938 HUM= 8.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HP	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	3520	.125	11.12	99	11.439	1769	59	39	2	.232	13.7	9	.5	0.0	919
2 25 PCT T	290	.263	13.93	410	19.220	10978	20	392	190	.077	1.5	30	10.8	17.7	351
3 55 PCT T	500	.902	19.59	1527	19.999	19923	57	807	973	.197	8.3	119	69.6	38.7	221
4 25 PCT T	140	.263	19.08	610	19.361	10297	13	381	136	.077	1.0	29	10.5	17.7	351
5 10 PCT T	140	.483	13.93	275	19.931	7938	10	537	97	.057	.6	31	2.7	7.1	927
6 25 PCT T	150	.300	13.93	610	19.247	10387	12	991	139	.077	1.0	54	10.7	17.7	353
7 90 PCT T	500	.287	19.59	2056	19.886	20502	78	800	882	.113	8.9	90	99.7	63.5	71
8 25 PCT T	210	.275	19.08	605	19.379	10206	17	395	139	.077	1.3	30	10.3	17.7	351
9 C.T.	13990	.159	9.69	21	11.269	1769	230	50	1	.193	32.9	7	.1	0.0	610
1 IDLE	3920	.120	11.00	93	11.552	1769	66	37	2	.232	15.9	9	.5	0.0	919
2 25 PCT T	360	.275	13.93	610	19.296	10933	30	907	139	.077	2.3	31	10.7	17.7	353
3 55 PCT T	590	.389	19.39	1527	19.890	19878	62	787	977	.197	9.0	116	70.1	38.6	221
4 25 PCT T	210	.325	19.08	580	19.428	10206	17	969	128	.077	1.3	36	9.8	17.7	351
5 10 PCT T	160	.540	13.93	270	19.488	8079	10	607	97	.057	.6	35	2.7	7.1	927
6 25 PCT T	140	.239	19.08	590	19.337	10342	13	349	133	.077	1.0	27	10.2	17.7	353
7 90 PCT T	950	1.290	19.23	1786	15.679	20957	193	3290	731	.113	16.1	372	82.6	63.9	71
8 25 PCT T	190	.275	19.08	585	19.371	10206	11	395	129	.077	.9	30	10.0	17.7	353
9 C.T.	12800	.159	9.69	21	11.195	1769	221	51	1	.193	31.5	7	.1	0.0	610

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 IDLE	16.3	0.0	0	3.9	R	R	.053	R	600	18.8	19.8	2.9	.2	9.7	0.0
2 25 PCT T	13.8	23.7	62	23.1	.975	6.0	.069	.593	2000	15.6	2.2	7.9	5.0	9.2	7.3
3 55 PCT T	8.7	51.9	136	32.9	.634	9.2	.067	.386	2000	19.8	12.0	31.3	32.9	29.9	30.9
4 25 PCT T	13.8	23.7	62	22.7	.959	5.8	.065	.583	2000	15.5	1.9	7.7	9.9	9.0	7.3
5 10 PCT T	16.8	9.6	25	17.5	1.827	5.0	.065	1.111	2000	15.9	.8	8.1	1.3	5.1	2.2
6 25 PCT T	13.9	23.7	62	22.9	.967	5.9	.064	.588	2000	15.6	1.9	9.0	5.0	9.1	7.3
7 90 PCT T	2.8	85.1	223	45.2	.531	10.9	.067	.323	2000	15.0	12.8	23.8	96.9	26.3	38.3
8 25 PCT T	13.8	23.7	62	22.5	.951	5.7	.065	.578	2000	15.5	1.9	8.0	9.8	8.9	7.3
9 C.T.	29.0	0.0	0	3.9	R	R	.052	R	2000	19.1	47.6	1.9	.1	2.9	0.0
1 IDLE	16.3	0.0	0	3.9	R	R	.053	R	600	18.9	19.7	1.3	.2	9.7	0.0
2 25 PCT T	13.9	23.7	62	23.0	.972	5.9	.069	.591	2000	15.6	2.9	9.7	5.9	9.1	7.3
3 55 PCT T	8.7	51.8	136	32.8	.633	9.3	.067	.385	2000	15.0	11.6	17.5	35.6	29.9	30.9
4 25 PCT T	13.8	23.7	62	22.5	.951	5.9	.065	.578	2000	15.9	1.7	5.9	5.0	8.9	7.3
5 10 PCT T	16.8	9.6	25	17.8	1.860	9.9	.065	1.132	2000	15.3	.7	5.2	1.9	5.2	2.2
6 25 PCT T	13.9	23.7	62	22.8	.963	5.6	.069	.586	2000	15.5	1.3	9.1	5.2	9.1	7.3
7 90 PCT T	2.9	85.0	223	45.1	.530	8.6	.070	.323	2000	19.2	20.6	56.1	92.0	26.3	38.3
8 25 PCT T	13.9	23.7	62	22.5	.951	5.5	.065	.578	2000	15.5	1.1	9.6	5.1	8.9	7.3
9 C.T.	29.0	0.0	0	3.9	R	R	.052	R	2000	19.2	90.9	1.1	.1	2.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------				3.7	20	11.6
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------				9.2	36	10.6
TWO CYCLE COMPOSITE -	HC- FID 0.35(3.7) + 0.65(9.2) =	9.038	G/KW HR	(3.011 G/)		
	CO- NDIR 0.35(20.9) + 0.65(35.7) =	30.391	G/KW HR	(22.625 G/)		
	NOx-CL 0.35(11.6) + 0.65(10.6) =	10.936	G/KW HR	(8.155 G/)		
	HC + NOX =	19.979	G/KW HR	(11.166 G/)		
	SFC =	.971	KG/KW HR	(.779 G/)		

TABLE B-19. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-109 RUN-01 BASELINE REPEAT 05-25-76 K= 1.059 HUM= 13.8 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	2480	.456	12.52	99	13.259	1819	38	126	2	.232	8.8	29	.5	0.0	999
2 25 PCT T	300	.287	14.23	510	14.551	10659	25	925	131	.077	1.9	33	10.1	17.0	393
3 55 PCT T	530	.456	14.54	1183	15.056	19878	60	910	911	.147	8.8	139	60.9	38.2	218
4 25 PCT T	190	.300	14.39	990	14.710	10933	15	929	122	.077	1.1	33	9.9	17.0	395
5 10 PCT T	170	.569	14.23	235	14.818	8210	11	636	96	.057	.6	36	2.6	6.8	919
6 25 PCT T	190	.337	14.23	990	14.588	10933	15	987	123	.077	1.1	37	9.5	17.0	395
7 90 PCT T	600	.511	14.70	1765	15.279	19368	87	1308	787	.113	9.8	148	88.9	60.5	63
8 25 PCT T	130	.300	14.23	525	14.594	10387	11	932	132	.077	.8	33	10.1	17.0	393
9 C.T.	13120	.216	11.24	21	12.907	1749	199	60	1	.193	28.9	9	.1	0.0	615
1 IDLE	2280	.559	13.07	51	13.881	1819	34	196	2	.232	7.8	39	.5	0.0	999
2 25 PCT T	390	.275	14.08	990	14.394	10933	28	903	125	.077	2.1	31	9.6	17.0	395
3 55 PCT T	540	.956	14.54	1207	15.057	19787	60	909	917	.147	8.9	133	61.3	38.2	218
4 25 PCT T	200	.293	14.23	510	14.596	10387	16	923	128	.077	1.2	33	9.9	17.0	395
5 10 PCT T	180	.590	14.08	265	14.690	8165	11	608	98	.057	.6	35	2.7	6.8	919
6 25 PCT T	180	.337	14.23	520	14.588	10933	15	987	131	.077	1.1	37	10.1	17.0	395
7 90 PCT T	600	.511	14.54	1807	15.119	19323	87	1319	812	.113	9.9	149	91.7	60.7	63
8 25 PCT T	190	.337	14.23	540	14.583	10387	11	985	135	.077	.9	37	10.9	17.0	393
9 C.T.	14720	.227	11.00	21	12.852	1749	229	63	1	.193	32.0	9	.1	0.0	615

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOx	FUEL	POWER
1 IDLE	17.5	0.0	0	9.0	R	R	.060	R	600	16.6	19.9	5.9	.3	9.8	0.0
2 25 PCT T	13.5	22.8	60	23.5	1.030	5.8	.065	.627	2000	15.3	3.1	6.7	5.3	9.9	7.2
3 55 PCT T	9.6	51.2	139	32.8	.641	8.1	.068	.390	2000	19.8	19.3	27.2	31.5	25.0	31.0
4 25 PCT T	13.4	22.9	60	23.0	1.008	5.9	.066	.613	2000	15.1	1.8	6.7	9.9	9.2	7.2
5 10 PCT T	16.5	9.1	29	18.1	1.983	5.1	.047	1.206	2000	15.0	1.0	7.9	1.9	5.9	2.1
6 25 PCT T	13.6	22.8	60	23.0	1.008	5.5	.066	.613	2000	15.3	1.8	7.6	9.9	9.2	7.2
7 90 PCT T	2.5	81.2	213	92.7	.526	9.8	.069	.320	2000	19.6	16.0	30.0	96.9	25.0	37.8
8 25 PCT T	13.5	22.9	60	22.9	1.002	5.9	.065	.609	2000	15.3	1.3	6.8	5.3	9.1	7.3
9 C.T.	29.2	0.0	0	3.9	R	R	.060	R	2000	16.8	96.3	1.7	.1	2.9	0.0
1 IDLE	17.4	0.0	0	9.0	R	R	.063	R	600	15.9	12.1	6.8	.3	9.8	0.0
2 25 PCT T	13.4	22.9	60	23.0	1.006	5.5	.065	.612	2000	15.4	3.3	6.2	9.9	9.2	7.2
3 55 PCT T	9.6	51.3	135	32.6	.636	9.3	.068	.387	2000	19.8	13.8	26.7	31.2	25.0	31.0
4 25 PCT T	13.4	22.8	60	22.9	1.003	5.7	.065	.610	2000	15.3	1.9	6.5	5.0	9.2	7.2
5 10 PCT T	16.5	9.1	29	18.0	1.969	5.3	.064	1.198	2000	15.2	1.0	7.0	1.9	5.3	2.1
6 25 PCT T	13.4	22.9	60	23.0	1.006	5.8	.066	.612	2000	15.3	1.7	7.5	5.1	9.2	7.2
7 90 PCT T	2.5	81.3	219	92.6	.529	10.1	.068	.319	2000	19.7	15.3	29.9	96.7	25.1	37.8
8 25 PCT T	13.5	22.9	60	22.9	1.002	6.0	.066	.609	2000	15.3	1.3	7.5	5.3	9.2	7.2
9 C.T.	29.2	0.0	0	3.9	R	R	.059	R	2000	16.8	99.5	1.8	.1	2.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------					3.9	28	10.8
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------					3.6	28	11.0
TWO CYCLE COMPOSITE -	HC- FID 0.35(3.9) + 0.65(3.6) =	3.660	G/KW	HR	(2.654	88)	
	CO- NDIR 0.35(27.6) + 0.65(27.9) =	27.826	G/KW	HR	(20.750	88)	
	NOx-CL 0.35(10.8) + 0.65(11.0) =	10.925	G/KW	HR	(8.197	88)	
	HC + NOX =	14.485	G/KW	HR	(10.801	88)	
	SFC =	.482	KG/KW	HR	(.792	88)	

TABLE B-20. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-109 RUN-02 BASELINE REPEAT 05-25-76 K= 1.084 HUM= 15.6 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1800	.771	12.79	52	13.769	1729	25	195	2	.232	5.9	45	.5	0.0	997
2 25 PCT T	290	.376	14.23	520	14.633	10978	20	593	139	.077	1.5	42	10.3	17.1	393
3 55 PCT T	520	.590	14.70	1292	15.299	19478	58	1040	935	.197	8.5	156	63.9	38.9	218
4 25 PCT T	190	.376	14.39	550	14.787	10933	15	535	190	.077	1.2	41	10.7	17.1	393
5 10 PCT T	200	.613	14.08	250	14.714	8165	13	687	50	.057	.7	39	2.8	6.8	919
6 25 PCT T	140	.350	14.39	590	14.758	10387	13	997	137	.077	1.0	38	10.5	17.1	395
7 90 PCT T	560	.999	14.70	1818	15.212	19368	81	1159	833	.113	9.2	130	94.1	60.8	66
8 25 PCT T	150	.350	14.39	565	14.757	10387	12	997	193	.077	.9	38	11.0	17.1	395
9 C.T.	19720	.337	11.98	25	13.950	1678	209	85	1	.193	29.1	12	.2	0.0	615
1 IDLE	2200	.598	12.79	53	13.635	1729	31	153	2	.232	7.3	35	.6	0.0	999
2 25 PCT T	320	.343	14.23	555	14.629	10978	24	525	193	.077	2.0	90	11.0	17.1	393
3 55 PCT T	580	.591	14.54	1230	15.197	19742	69	1157	929	.197	9.9	178	63.1	38.9	218
4 25 PCT T	200	.343	14.39	530	14.775	10387	16	515	139	.077	1.2	98	10.3	17.1	393
5 10 PCT T	180	.569	14.08	240	14.669	8119	11	636	98	.057	.6	36	2.7	6.8	922
6 25 PCT T	200	.350	14.23	560	14.602	10387	16	503	191	.077	1.2	39	10.8	17.1	393
7 90 PCT T	570	.999	14.70	1797	15.219	19278	82	1198	819	.113	9.3	130	92.6	60.9	66
8 25 PCT T	170	.337	14.39	565	14.796	10342	19	978	193	.077	1.0	37	11.0	17.1	393
9 C.T.	15340	.325	11.98	25	13.508	1729	217	89	1	.193	31.1	12	.2	0.0	620

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.6	0.0	0	3.8	R	R	.062	R	600	16.0	10.1	8.3	.3	9.6	0.0
2 25 PCT T	13.5	22.9	60	23.1	1.008	6.0	.066	.613	2000	15.2	2.4	7.7	5.1	9.3	7.2
3 55 PCT T	9.6	51.5	135	32.8	.637	8.6	.069	.389	2000	19.6	19.6	28.7	31.3	25.2	31.1
4 25 PCT T	13.5	22.9	60	23.0	1.003	6.2	.066	.610	2000	15.1	2.0	7.6	5.3	9.2	7.2
5 10 PCT T	16.5	9.2	24	18.0	1.962	5.5	.066	1.193	2000	15.1	1.2	7.2	1.9	5.9	2.1
6 25 PCT T	13.4	22.9	60	22.9	.998	6.1	.066	.607	2000	15.1	1.7	7.1	5.2	9.2	7.2
7 90 PCT T	2.4	81.6	219	42.7	.529	10.9	.068	.318	2000	19.6	15.8	29.0	96.1	25.2	37.8
8 25 PCT T	13.6	22.9	60	22.9	.998	6.9	.066	.607	2000	15.1	1.6	7.1	5.9	9.2	7.2
9 C.T.	29.2	0.0	0	3.7	R	R	.062	R	2000	16.1	50.2	2.2	.1	2.8	0.0
1 IDLE	17.5	0.0	0	3.8	R	R	.062	R	600	16.2	11.5	6.6	.3	9.6	0.0
2 25 PCT T	13.5	22.9	60	23.1	1.007	6.9	.066	.613	2000	15.2	3.2	7.5	5.9	9.3	7.2
3 55 PCT T	8.4	51.5	135	32.5	.631	8.5	.068	.389	2000	19.4	19.9	31.6	31.2	25.0	31.0
4 25 PCT T	13.5	22.9	60	22.9	.[illegible]98	6.0	.066	.607	2000	15.1	1.9	7.9	5.1	9.2	7.2
5 10 PCT T	16.6	9.2	24	17.9	1.949	5.3	.066	1.186	2000	15.1	1.8	6.7	1.3	5.3	2.1
6 25 PCT T	13.5	23.0	60	22.9	.993	6.3	.066	.607	2000	15.2	2.0	7.2	5.9	9.2	7.2
7 90 PCT T	2.6	81.4	219	42.5	.521	10.2	.068	.317	2000	19.6	19.7	29.1	95.8	25.2	37.8
8 25 PCT T	13.5	23.0	60	22.8	.993	6.3	.066	.604	2000	15.1	1.6	6.8	5.9	9.2	7.2
9 C.T.	29.9	0.0	0	3.8	R	R	.062	R	2000	16.0	99.2	2.2	.1	2.8	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 3.3 30 11.5

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 3.5 30 11.3

TWO CYCLE COMPOSITE -

HC- FID	0.35(3.3) + 0.65(3.5) =	3.444	G/KW HR	(2.568 BS)
CO- NDIR	0.35(30.4) + 0.65(30.2) =	30.303	G/KW HR	(22.597 BS)
NOX-CL	0.35(11.5) + 0.65(11.3) =	11.383	G/KW HR	(8.488 BS)
HC + NOX =		14.827	G/KW HR	(11.057 BS)
SFC =		.977	KG/KW HR	(.784 BS)

TABLE B-21. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-1 TEST-108 RUN-1 BASELINE CARB. 6607 1975 CHEV 350

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	452	1.9	16.5	2690	.525	12.52	51
2	1200	5.3	1	422	4.5	16.4	495	.876	12.52	110
3	1200	24.9	3	386	5.1	17.5	156	.115	12.52	155
4	1200	57.0	7	330	5.9	17.0	280	.216	12.79	270
5	1200	78.3	10	305	6.4	16.6	326	.275	13.07	370
6	1200	153.1	19	198	8.5	16.0	564	.287	13.49	920
7	1200	226.1	28	66	10.8	15.6	724	.402	13.78	1572
8	1200	249.2	31	61	11.2	15.0	1011	.771	13.93	1615
9	1200	279.5	35	46	12.8	13.5	1722	2.940	13.07	992
10	1200	309.4	38	8	14.8	12.9	1936	4.460	11.99	822
11	600	0.0	0	457	1.8	16.4	2691	.598	12.52	51
12	1200	0.0	0	584	1.9	16.1	66105	.915	5.42	11
13	2300	340.0	82	20	30.3	12.1	1719	5.840	11.61	895
14	2300	311.5	75	51	28.1	12.6	1596	4.690	12.25	846
15	2300	275.9	66	66	22.9	14.6	456	.643	14.54	1930
16	2300	254.6	61	86	21.5	14.9	262	.275	14.70	1930
17	2300	170.9	41	239	16.7	14.9	503	.583	14.86	1903
18	2300	83.2	20	361	12.2	14.9	159	.389	14.54	670
19	2300	60.5	15	391	11.0	15.2	68	.287	14.39	510
20	2300	26.7	6	437	9.2	15.3	91	.300	14.23	240
21	2300	5.3	1	467	8.2	15.3	113	.442	14.08	195
22	600	0.0	0	457	1.7	16.6	2018	.428	12.65	52
23	2300	5.3	1	630	1.8	17.9	27743	.239	8.81	18

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	37.6	148	2.4	.070	0	4.1	R	R	R
2	16.5	591	12.2	.060	4	9.9	24.61	880.6	18.2
3	6.3	93	20.7	.060	18	11.2	2.00	29.7	6.6
4	12.6	196	40.2	.050	42	12.9	1.76	27.3	5.6
5	15.5	264	58.3	.030	58	14.0	1.57	26.8	5.9
6	34.7	358	188.3	.060	113	18.8	1.81	18.6	9.8
7	54.6	612	393.6	0.000	167	23.7	1.92	21.5	13.9
8	76.5	1179	405.8	.040	184	24.7	2.44	37.6	13.0
9	136.1	4699	260.3	0.000	206	28.2	3.88	133.7	7.4
10	172.0	8004	242.5	0.000	225	32.6	4.50	209.2	6.3
11	36.5	164	2.3	.070	0	4.0	R	R	R
12	987.8	125	.5	.120	0	4.1	R	R	R
13	296.0	20315	511.7	.025	251	66.9	3.61	248.1	6.2
14	262.1	15556	461.2	.055	230	61.9	3.49	207.3	6.1
15	68.5	1951	961.9	.035	209	50.9	1.03	29.9	14.5
16	37.6	798	920.3	.060	188	47.5	.61	13.0	15.0
17	54.3	1273	503.2	.060	126	36.9	1.32	30.9	12.2
18	13.0	639	180.9	0.000	62	26.8	.64	31.7	9.0
19	5.1	434	126.6	.065	45	24.2	.35	29.8	8.7
20	5.7	383	50.5	0.000	20	20.3	.89	59.6	7.8
21	6.4	501	36.4	0.000	4	18.0	4.95	389.8	28.3
22	26.2	112	2.2	.080	0	3.8	R	R	R
23	415.1	72	.9	.060	4	3.9	322.69	56.2	.7

CYCLE COMPOSITE	HC	9.935	GRAM/ KW HR	(7.408 BS)
	CO	92.909	GRAM/ KW HR	(69.282 BS)
	NOX	10.513	GRAM/ KW HR	(7.839 BS)
	SFC	.467	KG/ KW HR	(.768 BS)
CORRECTED	NOX	9.815	GRAM/ KW HR	(7.319 BS)

TABLE B-22. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-1 TEST-108 RUN-2 BASELINE CARB. 6607 1975 CHEV 350

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	462	1.7	16.4	2469	.690	12.52	49
2	1200	5.3	1	422	4.5	16.6	449	.823	12.38	113
3	1200	24.9	3	381	5.0	17.3	296	.115	12.65	155
4	1200	55.2	7	345	5.8	17.0	269	.216	12.79	270
5	1200	78.3	10	305	6.4	16.5	337	.275	13.07	370
6	1200	151.3	19	203	8.3	16.0	541	.287	13.49	880
7	1200	227.4	29	71	10.3	15.4	733	.363	13.49	1392
8	1200	251.0	32	61	11.4	15.0	999	.722	13.43	1572
9	1200	279.5	35	41	12.4	13.2	1886	3.700	12.52	773
10	1200	299.1	38	8	13.7	12.4	2018	4.290	12.25	846
11	600	0.0	0	462	1.7	16.4	2647	.643	12.52	52
12	1200	1.8	0	584	1.4	16.2	64158	.402	5.57	12
13	2300	336.5	81	20	30.6	12.2	1810	5.840	11.48	822
14	2300	313.3	75	46	28.6	12.3	1738	5.440	11.73	650
15	2300	277.7	67	66	22.8	14.3	571	.841	14.54	1807
16	2300	254.6	61	81	21.2	15.0	273	.300	14.54	1949
17	2300	169.1	41	239	16.5	14.5	502	.598	14.70	1415
18	2300	85.4	21	361	12.2	14.8	194	.469	14.54	720
19	2300	60.5	15	386	11.0	15.1	91	.337	14.39	540
20	2300	28.5	7	432	9.3	15.3	45	.287	14.23	310
21	2300	7.1	2	462	8.1	15.4	113	.469	13.43	200
22	600	0.0	0	457	1.7	16.6	2017	.511	12.52	52
23	2300	7.1	2	630	1.8	17.4	27743	.239	8.81	18

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	31.6	179	2.1	.070	0	3.8	R	R	R
2	15.2	564	12.7	.060	4	9.4	22.67	839.7	18.9
3	9.6	90	20.1	.060	18	11.0	3.06	28.8	6.4
4	11.9	193	39.6	.050	41	12.7	1.71	27.8	5.7
5	16.0	264	58.3	.030	58	14.0	1.63	26.8	5.9
6	32.7	350	176.3	.060	112	18.4	1.72	18.4	9.3
7	54.0	539	340.2	0.000	168	22.6	1.89	18.8	11.9
8	77.4	1130	404.4	.040	185	25.2	2.45	35.8	12.8
9	148.1	5868	201.5	0.000	206	28.4	4.22	167.1	5.7
10	165.1	7041	229.8	0.000	221	30.2	4.34	188.7	6.1
11	33.1	162	2.2	.070	0	3.7	R	R	R
12	963.2	122	.6	.120	1	4.1	4305.67	544.6	2.7
13	316.2	20608	476.7	.025	248	67.4	3.40	254.3	5.4
14	286.4	18135	356.1	.055	231	63.1	3.80	240.3	4.7
15	84.2	2651	883.8	.035	205	50.3	1.26	39.6	13.2
16	38.4	863	922.0	.060	188	46.7	.63	14.1	15.0
17	53.4	1246	504.0	.060	125	36.3	1.32	31.8	12.4
18	15.8	772	144.8	0.000	63	27.0	.77	37.5	4.5
19	6.8	504	134.1	.065	45	24.3	.47	34.4	9.2
20	2.4	370	65.6	0.000	21	20.4	.42	53.4	4.6
21	6.4	534	37.4	0.000	5	17.4	3.72	311.3	21.8
22	26.3	134	2.2	.080	0	3.8	R	R	R
23	415.1	72	.4	.060	5	3.4	242.02	42.2	.5

CYCLE COMPOSITE	HC	4.867	GRAM/ KW HR	(7.358 BS)
	CO	102.396	GRAM/ KW HR	(76.357 BS)
	NOX	4.992	GRAM/ KW HR	(7.451 BS)
	SFC	.464	KG/ KW HR	(.764 BS)
CORRECTED	NOx	4.480	GRAM/ KW HR	(7.069 BS)

TABLE B-23. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-1 TEST-108 RUN-3 BASELINE CARB. 6607 1975 CHEV 350

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	962	1.8	16.5	2332	.559	12.52	50
2	1200	5.3	1	927	4.4	17.6	491	.104	12.38	113
3	1200	24.9	3	381	5.2	17.6	290	.159	12.38	163
4	1200	57.0	7	335	5.9	16.9	269	.239	12.79	260
5	1200	78.3	10	310	6.4	16.5	360	.312	13.07	370
6	1200	153.1	19	198	8.4	16.2	552	.300	13.35	920
7	1200	226.1	28	66	10.7	15.9	745	.389	13.49	1483
8	1200	251.0	32	61	11.5	15.0	1056	.841	13.78	1549
9	1200	279.5	35	46	13.1	13.3	1839	3.500	12.65	798
10	1200	299.1	38	8	14.1	13.0	1992	4.400	11.99	822
11	600	0.0	0	957	1.8	16.4	2612	.613	12.52	52
12	1200	0.0	0	584	1.9	16.1	63576	.928	5.71	13
13	2300	334.7	81	20	30.4	12.3	1739	5.840	11.36	699
14	2300	311.5	75	46	28.1	12.3	1762	5.710	11.48	575
15	2300	277.7	67	66	22.9	14.4	685	.995	14.39	1765
16	2300	256.3	62	76	21.5	15.0	307	.325	14.54	1909
17	2300	169.1	41	239	16.6	14.6	559	.659	14.54	1346
18	2300	83.7	20	361	12.0	15.0	205	.469	14.39	670
19	2300	60.5	15	386	10.9	15.2	113	.363	14.23	500
20	2300	28.5	7	432	9.3	15.3	79	.337	14.23	300
21	2300	7.1	2	462	8.2	15.4	159	.497	13.93	195
22	600	0.0	0	952	1.8	17.1	2011	.415	12.25	50
23	2300	8.4	2	630	1.7	17.7	30471	.251	8.62	16

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	31.0	149	2.2	.070	0	3.9	R	R	R
2	17.4	74	13.3	.060	4	9.8	25.94	110.7	19.8
3	11.4	132	22.3	.060	18	11.4	3.81	42.1	7.1
4	12.1	219	38.7	.050	42	12.4	1.68	30.3	5.4
5	17.3	303	54.0	.030	58	14.2	1.75	30.7	6.0
6	34.0	373	188.0	.060	113	18.6	1.77	19.4	9.8
7	56.4	600	376.1	0.000	167	23.5	2.00	21.1	13.2
8	82.0	1347	399.4	.040	185	25.3	2.60	44.3	12.7
9	147.1	5655	211.4	0.000	206	28.8	4.14	161.0	6.0
10	168.4	7534	231.3	0.000	221	31.0	4.44	200.5	6.2
11	35.5	163	2.3	.070	0	3.9	R	R	R
12	446.2	124	.6	.120	0	4.1	R	R	R
13	304.6	20666	406.6	.025	247	67.1	3.78	256.4	5.0
14	285.3	18674	309.1	.055	230	62.0	3.80	248.9	4.1
15	101.4	2838	871.4	.035	205	50.5	1.52	42.4	13.0
16	44.4	948	416.8	.060	184	47.5	.72	15.4	14.8
17	61.0	1453	487.7	.060	125	36.7	1.50	35.7	12.0
18	16.5	766	174.7	0.000	62	26.5	.82	38.0	8.4
19	8.5	546	123.7	.065	45	24.0	.58	37.5	8.5
20	5.0	432	63.2	0.000	21	20.4	.74	63.0	9.2
21	4.0	571	36.8	0.000	5	18.1	5.26	332.7	21.5
22	28.4	118	2.3	.080	0	4.0	R	R	R
23	440.7	73	.8	.060	7	3.8	205.55	34.2	.4

CYCLE COMPOSITE	HC	4.437	GRAM/ KW HR	(7.410 83)
	CO	104.418	GRAM/ KW HR	(77.864 83)
	NOX	4.665	GRAM/ KW HR	(7.207 83)
	SFC	.466	KG/ KW HR	(.766 83)
CORRECTED	NOX	4.240	GRAM/ KW HR	(6.890 83)

TABLE B-24. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-01 TEST-107 RUN-HOT 05-19-76 BASELINE CAPR. 6607 K= .938 HUM= 8.3 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CRW	VAC. MM
1	2000	1620	5.570	11.48	846	17.238	25995	282	16935	923	282.3	16935	396.7	71.2	15
2	2000	1670	5.690	11.48	822	17.313	25991	290	17103	910	290.9	17103	389.9	71.2	15
3	2000	1760	5.710	11.48	839	17.398	25995	309	17205	913	309.3	17205	387.6	70.5	15

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1		.6	95.9	251	57.2	2.97	178.27	4.95	.599	12.9	.081	3.98	239.06	5.97	.365
2		.6	96.5	251	57.3	3.06	180.03	4.81	.600	12.3	.081	4.10	241.42	5.78	.365
3		.6	99.6	258	57.2	3.26	183.03	4.39	.605	12.3	.082	4.34	245.45	5.89	.368

ID =

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-01 TEST-109 RUN-HOT 05-25-76 BASELINE REPEAT K= 1.092 HUM= 25.7 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CRW	VAC. MM
1	2000	1600	6.050	11.29	625	17.990	25179	300	17582	299	300.9	17582	325.9	68.2	9
2	2000	1790	5.990	11.29	637	18.881	25220	300	16917	314	300.1	16917	349.9	68.5	15

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1		.3	91.5	240	55.5	3.39	195.35	3.32	.607	12.1	.082	4.48	261.97	4.45	.369
2		.6	91.9	241	55.6	3.33	182.91	3.51	.605	12.4	.079	4.47	249.62	4.71	.368

ID =

TABLE B-25. MASS EMISSIONS BY NINE-MODE FTP -METRIC UNITS

ENGINE-2 TEST-201 RUN-2 CHEV. 350 BASELINE 03-16-76 K = .826 HUM = 9.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NO2	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NO2-CL	KW	HP
1 IDLE	3569	.290	12.21	63	12.807	1639	96	62	3	.232	10.6	14	.6	0	0
2 16 MG	725	.730	13.70	530	14.503	9980	97	969	115	.077	3.7	74	8.9	15	20
3 10 MG	1116	.970	13.98	1875	15.062	14878	110	1936	615	.147	16.2	285	90.9	39	52
4 16 MG	955	1.170	13.70	613	14.916	9980	29	1502	129	.077	2.2	116	10.0	15	20
5 19 MG	953	.290	13.98	113	14.265	6623	11	225	17	.057	1.2	13	1.0	0	0
6 16 MG	386	.730	13.98	625	14.799	9980	25	998	133	.077	1.9	73	10.3	15	20
7 3 MG	1116	.970	13.98	2700	15.062	20231	150	2632	1209	.113	16.9	297	136.1	63	85
8 16 MG	387	.850	13.98	640	14.869	9980	25	1095	135	.077	1.9	84	10.9	15	20
9 C.T.	23916	.900	10.31	33	13.102	1860	340	115	2	.193	98.6	16	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.9	56	15.9		
1 IDLE	3366	.320	12.87	67	13.527	1639	91	78	3	.232	9.9	18	.6	0	0
2 16 MG	727	.820	13.83	580	14.723	9980	97	1067	129	.077	3.6	82	9.5	15	20
3 10 MG	1147	1.300	13.83	1750	15.250	14878	117	2562	517	.147	17.2	377	83.3	39	52
4 16 MG	932	.850	13.83	588	14.723	9980	28	1106	126	.077	2.1	85	9.7	15	20
5 19 MG	269	.290	12.79	120	13.007	6623	19	297	20	.057	.8	19	1.2	0	0
6 16 MG	920	.730	13.98	680	14.752	9980	27	998	145	.077	2.1	73	11.2	15	20
7 3 MG	1109	.990	13.98	2750	15.030	20231	199	2556	1229	.113	16.8	289	138.9	63	85
8 16 MG	387	.910	13.98	640	14.929	9980	25	1167	135	.077	1.9	90	10.9	15	20
9 C.T.	19723	.350	10.53	37	12.852	1860	285	102	2	.193	98.8	15	.3	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.5	60	15.3		
1 IDLE	3359	.350	12.60	68	13.286	1639	91	87	3	.232	9.6	20	.6	0	0
2 16 MG	795	.850	13.83	585	14.760	9980	51	1103	108	.077	3.9	85	8.3	15	20
3 10 MG	1190	1.170	13.98	1775	15.269	14878	111	2309	579	.147	16.3	339	84.9	39	52
4 16 MG	959	.790	13.83	638	14.665	9980	29	1032	137	.077	2.3	79	10.5	15	20
5 19 MG	297	.290	13.01	130	13.275	6623	12	292	22	.057	.7	19	1.2	0	0
6 16 MG	932	.730	13.98	690	14.753	9980	28	998	147	.077	2.1	73	11.3	15	20
7 3 MG	1116	1.080	13.98	2700	15.092	20231	150	2708	1202	.113	16.9	306	135.8	63	85
8 16 MG	989	.850	13.98	640	14.871	9980	26	1095	135	.077	2.0	84	10.4	15	20
9 C.T.	19656	.380	10.09	35	12.936	1860	299	115	2	.193	92.0	16	.6	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.5	59	15.2		
1 IDLE	3359	.270	12.47	73	13.075	1639	92	68	3	.232	9.7	16	.7	0	0
2 16 MG	750	.730	13.98	590	14.785	9980	98	996	126	.077	3.7	73	9.7	15	20
3 10 MG	1186	1.200	13.98	1775	15.299	14878	115	2357	573	.147	17.0	347	84.2	39	52
4 16 MG	955	.910	13.83	575	14.785	9980	29	1179	122	.077	2.2	91	9.9	15	20
5 19 MG	291	.210	12.79	115	12.979	6623	15	216	19	.057	.8	12	1.1	0	0
6 16 MG	932	.730	13.98	715	14.753	9980	28	998	153	.077	2.1	73	11.7	15	20
7 3 MG	1092	.990	13.98	2750	15.029	20231	197	2556	1229	.113	16.6	289	138.9	63	85
8 16 MG	910	.910	13.98	640	14.931	9980	26	1167	135	.077	2.0	90	10.9	15	20
9 C.T.	20399	.900	10.31	38	12.750	1860	298	118	2	.193	92.6	17	.3	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											5.6	58	15.9		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)----------											5.7	58	15.9		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 9)----------											5.6	58	15.3		

FOUR CYCLE COMPOSITE -

HC- FID 0.35(5.7) + 0.65(5.6) = 5.609 G/ KW HR (9.183 BS)

CO- NDIR 0.35(58.1) + 0.65(58.4) = 58.268 G/ KW HR (93.950 BS)

NO2-CL 0.35(15.9) + 0.65(15.3) = 15.301 G/ KW HR (11.910 BS)

CORRECTED NO2 = 12.637 G/ KW HR (9.923 BS)

SFC = .485 KG/ KW HR (.798 BS)

TABLE B-26. MASS EMISSIONS BY NINE-MODE FTP -METRIC UNITS

ENGINE-2 TEST-201 RUN-3 CHEV. 350 BASELINE 03-16-76 K = .826 HUM = 9.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NO2	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NO2-CL	KW	HP
1 IDLE	2906	.290	12.97	68	13.001	1639	37	61	3	.232	8.5	14	.7	0	0
2 16 MG	805	.610	13.83	630	14.520	9980	53	809	137	.077	9.0	62	10.5	15	20
3 10 MG	1227	.760	13.98	1913	14.863	19878	123	1537	636	.197	18.1	226	93.5	39	52
4 16 MG	681	.790	13.83	625	14.688	9980	99	1030	139	.077	3.9	79	10.3	15	20
5 14 MG	359	.350	12.74	135	13.126	6623	18	357	23	.057	1.0	20	1.3	0	0
6 16 MG	636	.790	13.83	610	14.684	9980	91	1030	131	.077	3.2	79	10.1	14	19
7 3 MG	1214	.670	13.83	2850	14.621	20230	168	1873	1309	.113	14.0	212	147.9	63	85
8 16 MG	636	.880	13.83	590	14.774	9980	91	1141	126	.077	3.1	88	9.7	14	19
9 C.T.	39287	.930	9.66	30	13.514	1860	972	120	1	.193	67.5	17	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											7.4	96	16.4		
1 IDLE	2693	.960	12.74	71	13.969	1639	33	113	3	.232	7.6	26	.7	0	0
2 16 MG	907	.760	13.70	650	14.551	9980	59	1000	141	.077	4.6	77	10.8	15	20
3 10 MG	1273	.820	13.98	1863	14.927	19878	127	1651	616	.197	18.7	243	90.6	39	52
4 16 MG	798	.850	13.56	625	14.485	9980	99	1129	136	.077	3.8	87	10.5	15	20
5 14 MG	992	.290	12.60	120	12.939	6623	25	300	20	.057	1.4	17	1.2	0	0
6 16 MG	680	.760	13.70	680	14.528	9980	99	1002	147	.077	3.4	77	11.3	14	19
7 3 MG	1179	.670	13.83	2850	14.618	20230	163	1873	1309	.113	18.4	212	148.0	63	85
8 16 MG	613	.850	13.70	570	14.611	9980	90	1114	123	.077	3.1	86	9.5	14	19
9 C.T.	33999	.930	9.35	30	13.130	1860	975	123	1	.193	67.4	18	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											7.4	99	16.3		
1 IDLE	2689	.900	12.60	73	13.269	1639	33	100	3	.232	7.7	23	.7	0	0
2 16 MG	629	.760	13.83	590	14.652	9980	90	993	127	.077	3.1	76	9.8	15	20
3 10 MG	1251	.850	13.98	1837	14.955	19878	129	1708	607	.197	18.3	251	89.2	39	52
4 16 MG	692	.850	13.70	575	14.619	9980	95	1113	129	.077	3.5	86	9.5	15	20
5 14 MG	398	.350	12.87	190	13.255	6623	17	353	23	.057	1.0	20	1.3	0	0
6 16 MG	639	.730	13.56	670	14.353	9980	92	979	149	.077	3.2	75	11.3	14	19
7 3 MG	1157	.670	13.83	2900	14.616	20230	160	1873	1333	.113	18.1	212	150.6	63	85
8 16 MG	601	.850	13.70	650	14.610	9980	39	1114	140	.077	3.0	86	10.8	14	19
9 C.T.	33528	.930	9.45	30	13.233	1860	971	122	1	.193	67.4	17	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											7.2	99	16.4		
1 IDLE	2379	.990	12.74	72	13.968	1639	29	120	3	.232	6.7	28	.7	0	0
2 16 MG	816	.670	13.70	600	14.452	9980	59	888	131	.077	4.1	68	10.1	15	20
3 10 MG	1158	.820	13.83	1800	14.766	19878	117	1669	602	.197	17.2	245	88.5	39	52
4 16 MG	613	.790	13.83	600	14.681	9980	90	1030	129	.077	3.0	79	9.9	15	20
5 14 MG	397	.610	10.54	220	11.190	6623	29	729	43	.057	1.3	42	2.5	0	0
6 16 MG	578	.670	13.83	650	14.558	9980	38	881	141	.077	2.9	68	10.8	14	19
7 3 MG	1112	.700	13.83	2900	14.691	20230	159	1959	1330	.113	17.4	221	150.3	63	85
8 16 MG	568	.820	13.83	650	14.707	9980	37	1068	139	.077	2.8	82	10.7	14	19
9 C.T.	30749	.990	9.45	31	13.015	1860	939	141	1	.193	62.8	20	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											6.8	99	16.4		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)----------											7.4	97	16.4		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 4)----------											7.0	99	16.4		

FOUR CYCLE COMPOSITE -

HC- FID 0.35(7.4) + 0.65(7.0) = 7.168 G/ KW HR (5.345 GB)

CO- NDIR 0.35(97.4) + 0.65(99.1) = 98.509 G/ KW HR (36.173 GB)

NO2-CL 0.35(16.4) + 0.65(16.4) = 16.389 G/ KW HR (12.217 GB)

CORRECTED NO2 = 13.531 G/ KW HR (10.090 GB)

SFC = .986 KG/ KW HR (.800 GB)

TABLE B-27. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

ENGINE-02 TEST-205 RUN-02 1975 CHEVROLET 350-CID HO ENGINE---PROJECT 11-9311
CHEV. 350 BASELINE 03-29-76 K= .961 HUM= 9.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	2200	.320	12.47	68	13.036	1860	35	92	3	.232	8.1	21	.7	0.0	934
2 25 PCT T	930	.670	13.98	800	14.699	9979	33	919	173	.077	2.6	71	13.3	17.9	358
3 55 PCT T	1080	1.170	13.83	1700	15.123	14969	122	2339	537	.197	17.9	399	78.9	38.0	221
4 25 PCT T	920	.730	13.83	750	14.608	9979	33	1007	169	.077	2.5	76	12.6	17.3	363
5 10 PCT T	280	.970	13.56	320	14.562	7620	17	1025	53	.057	.9	58	3.0	6.9	919
6 25 PCT T	900	.790	13.83	770	14.665	9979	31	1086	167	.077	2.4	84	12.9	17.3	366
7 90 PCT T	1060	1.300	13.83	2350	15.251	20912	162	3515	1009	.113	18.3	397	113.9	62.3	61
8 25 PCT T	380	.820	13.83	720	14.693	9979	29	1125	156	.077	2.3	87	12.0	17.2	361
9 C.T.	32000	.960	9.05	28	12.991	1819	986	130	1	.193	69.5	19	.2	0.0	599
1 IDLE	2200	.900	13.01	72	13.657	1860	34	110	3	.232	7.8	26	.7	0.0	939
2 25 PCT T	690	.790	13.83	775	14.493	9979	99	1089	148	.077	3.8	83	12.9	17.2	360
3 55 PCT T	1080	1.300	13.83	1700	15.253	14969	121	2527	532	.197	17.8	379	78.3	37.9	229
4 25 PCT T	900	.850	13.83	750	14.725	9979	31	1169	162	.077	2.9	90	12.5	17.3	358
5 10 PCT T	320	.910	13.56	330	14.506	7620	19	966	55	.057	1.1	55	3.2	6.9	922
6 25 PCT T	930	.850	13.83	770	14.729	9979	33	1143	146	.077	2.5	90	12.8	17.9	373
7 90 PCT T	1100	1.370	13.83	2375	15.325	20689	169	3735	1023	.113	19.1	422	115.6	62.7	61
8 25 PCT T	920	.850	13.83	720	14.728	9979	32	1163	156	.077	2.5	90	12.0	17.3	373
9 C.T.	32000	.960	9.05	28	12.991	1819	986	130	1	.193	69.5	19	.2	0.0	597

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CMP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.1	0.0	0	9.1	R	R	.059	R	600	16.9	6.5	1.8	.3	5.0	0.0
2 25 PCT T	19.1	23.9	61	22.0	.990	7.6	.064	.572	2000	15.1	2.1	6.1	5.9	8.8	7.3
3 55 PCT T	8.7	51.0	133	33.0	.697	10.8	.068	.399	2012	19.6	19.9	29.7	31.9	25.3	30.5
4 25 PCT T	19.3	23.2	61	22.0	.998	7.2	.066	.577	1987	15.2	2.0	6.7	5.1	8.8	7.3
5 10 PCT T	16.5	9.2	25	16.8	1.819	5.9	.066	1.107	1975	15.2	.8	5.0	1.2	5.0	2.1
6 25 PCT T	19.9	23.2	61	22.0	.998	7.9	.066	.577	1987	15.1	1.9	7.2	5.2	8.8	7.3
7 90 PCT T	2.9	83.6	217	95.0	.539	12.3	.069	.328	2025	19.5	19.7	34.3	95.9	26.5	38.9
8 25 PCT T	19.2	23.1	61	22.0	.953	6.9	.066	.580	1975	15.1	1.8	7.5	9.9	8.8	7.2
9 C.T.	23.9	0.0	0	9.0	R	R	.062	R	1987	16.2	55.9	1.6	.1	3.0	0.0
1 IDLE	17.1	0.0	0	9.1	R	R	.062	R	587	16.2	6.2	2.0	.3	9.9	0.0
2 25 PCT T	19.5	23.1	61	22.0	.952	7.9	.066	.579	1975	15.1	3.0	6.7	5.2	8.8	7.2
3 55 PCT T	9.0	50.8	133	33.0	.650	10.8	.069	.395	2000	19.5	19.0	30.3	31.5	25.2	30.3
4 25 PCT T	19.1	23.2	62	22.0	.998	7.2	.066	.577	1975	15.0	1.9	7.2	5.0	8.8	7.3
5 10 PCT T	16.6	9.3	25	16.8	1.813	6.1	.066	1.103	1975	15.3	.9	4.9	1.3	5.0	2.1
6 25 PCT T	19.7	23.3	62	22.0	.995	7.3	.066	.575	1987	15.0	2.0	7.2	5.2	8.8	7.3
7 90 PCT T	2.9	89.1	218	95.6	.592	12.5	.069	.330	2025	19.4	15.1	33.7	96.6	26.8	38.6
8 25 PCT T	19.2	23.2	62	22.0	.999	6.9	.066	.577	1975	15.0	2.0	7.2	9.8	8.8	7.2
9 C.T.	23.5	0.0	0	9.0	R	R	.062	R	1987	16.2	55.0	1.5	.1	3.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 6.9 65 13.8
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 7.1 70 13.9

TWO CYCLE COMPOSITE -

HC- FID	0.35(	6.9) + 0.65(	7.1) =	7.026	G/KW HR	(5.239 BS)
CO- NDIR	0.35(	69.5) + 0.65(	70.0) =	68.087	G/KW HR	(50.773 BS)
NOX-CL	0.35(	13.8) + 0.65(	13.9) =	13.837	G/KW HR	(10.318 BS)
			HC + NOX =	20.863	G/KW HR	(15.557 BS)
			SFC =	.975	KG/KW HR	(.781 BS)

TABLE B-28. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-285 RUN-03 CHEV. 350 BASELINE 03-29-76 K= 1.000 HUM= 11.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	2320	.350	12.70	70	13.350	1860	36	98	3	.232	8.4	23	.8	0.0	452
2 25 PCT T	930	.730	14.12	780	14.905	9979	37	987	175	.077	2.8	76	13.5	16.8	346
3 55 PCT T	1090	1.300	13.83	1650	15.299	19969	116	2578	592	.147	17.1	379	79.7	37.1	231
4 25 PCT T	930	.670	14.12	780	14.839	9979	33	910	176	.077	2.5	70	13.5	16.9	368
5 10 PCT T	320	.970	13.54	340	14.566	7620	19	1025	60	.057	1.1	58	3.9	6.7	434
6 25 PCT T	910	.730	14.12	750	14.897	9979	31	988	168	.077	2.4	76	12.9	17.0	381
7 90 PCT T	1140	1.570	13.70	2150	15.902	20689	178	9259	966	.113	20.1	981	109.2	61.9	41
8 25 PCT T	990	.790	14.12	790	14.960	9979	33	1069	176	.077	2.6	82	13.6	17.0	368
9 C.T.	29720	.930	9.29	32	13.017	1819	966	121	1	.193	66.7	17	.2	0.0	617
1 IDLE	2980	.350	12.70	69	13.359	1860	37	98	3	.232	8.7	23	.7	0.0	999
2 25 PCT T	780	.760	14.12	810	14.960	9979	53	1029	181	.077	4.1	79	13.9	17.0	366
3 55 PCT T	1190	1.370	13.83	1662	15.335	19969	131	2701	593	.147	19.3	397	79.8	37.3	229
4 25 PCT T	930	.730	14.12	810	14.899	9979	33	988	182	.077	2.5	76	14.0	17.0	358
5 10 PCT T	920	1.050	13.70	330	14.788	7620	25	1083	57	.057	1.4	62	3.2	6.8	427
6 25 PCT T	980	.730	14.12	800	14.905	9979	37	987	179	.077	2.8	76	13.8	17.0	373
7 90 PCT T	1220	1.480	13.83	2162	15.550	20689	189	9485	957	.113	20.8	507	108.1	61.6	41
8 25 PCT T	980	.830	14.12	810	15.005	9979	36	1115	180	.077	2.8	86	13.9	16.9	373
9 C.T.	29990	.930	9.95	32	13.093	1819	995	120	1	.193	63.7	17	.2	0.0	617

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.8	0.0	0	9.1	R	R	.061	R	600	16.5	6.8	1.8	.3	9.9	0.0
2 25 PCT T	19.9	22.5	60	22.0	.977	7.7	.067	.599	1987	14.9	2.3	6.0	5.5	8.8	7.2
3 55 PCT T	9.1	99.7	129	33.0	.669	10.8	.069	.909	2025	14.5	13.8	30.0	32.3	25.2	30.2
4 25 PCT T	19.5	22.7	60	22.0	.969	7.7	.067	.590	2000	15.0	2.0	5.5	5.5	8.8	7.2
5 10 PCT T	17.1	9.0	29	16.8	1.872	6.6	.066	1.139	1975	15.2	.9	9.6	1.9	5.0	2.1
6 25 PCT T	15.0	22.7	60	22.0	.967	7.9	.067	.588	2000	14.9	1.9	6.0	5.2	8.8	7.2
7 90 PCT T	2.9	83.0	211	95.6	.599	11.6	.070	.339	2062	14.3	16.2	38.1	99.3	26.8	38.8
8 25 PCT T	19.5	22.9	60	22.0	.965	7.7	.067	.587	2000	14.8	2.1	6.5	5.5	8.8	7.3
9 C.T.	29.3	0.0	0	9.0	R	R	.062	R	2000	16.2	53.9	1.9	.1	3.0	0.0
1 IDLE	17.5	0.0	0	9.1	R	R	.061	R	575	16.5	6.9	1.7	.3	9.9	0.0
2 25 PCT T	19.9	22.8	60	22.0	.965	7.9	.067	.587	2000	14.8	3.2	6.0	5.6	8.8	7.3
3 55 PCT T	9.0	50.0	130	33.0	.660	10.8	.069	.901	2025	14.9	15.3	30.0	32.2	25.2	30.9
4 25 PCT T	19.1	22.8	60	22.0	.965	7.9	.067	.587	2000	14.9	2.0	5.8	5.6	8.8	7.3
5 10 PCT T	16.8	9.1	29	16.8	1.892	6.2	.067	1.120	2000	15.0	1.1	9.7	1.3	5.0	2.1
6 25 PCT T	19.7	22.8	60	22.0	.965	7.8	.067	.587	2000	14.9	2.2	5.7	5.6	8.8	7.3
7 90 PCT T	2.9	82.6	212	95.4	.552	11.6	.071	.336	2050	14.1	16.5	38.3	93.6	26.8	38.5
8 25 PCT T	19.7	22.7	60	22.0	.971	7.9	.068	.591	1987	14.8	2.2	6.5	5.6	8.8	7.2
9 C.T.	29.3	0.0	0	9.0	R	R	.062	R	2000	16.1	50.5	1.3	.1	3.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 6.8 70 13.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 7.0 73 13.7

TWO CYCLE COMPOSITE -

HC- FID 0.35(6.8) + 0.65(7.0) = 6.919 G/KW HR (5.160 BS)

CO- NDIR 0.35(69.7) + 0.65(73.1) = 71.885 G/KW HR (53.609 BS)

NOX-CL 0.35(13.6) + 0.65(13.7) = 13.663 G/KW HR (10.188 BS)

HC + NOX = 20.582 G/KW HR (15.348 BS)

SFC = .989 KG/KW HR (.796 BS)

TABLE B-29. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-2 TEST-203 RUN-1 CHEV. 350 BASELINE 03-18-76

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	937	1.6	16.2	3367	.990	12.79	62
2	1200	5.4	1	917	4.4	17.0	269	.270	12.79	143
3	1200	24.4	3	396	4.9	16.9	224	.320	12.79	170
4	1200	54.2	7	353	5.7	16.5	270	.380	13.01	300
5	1200	75.9	10	328	6.5	16.2	450	.960	13.14	440
6	1200	151.9	19	229	8.5	15.4	872	.730	13.56	1063
7	1200	226.4	28	86	10.3	16.1	879	.900	13.28	1688
8	1200	246.8	31	63	11.2	15.9	970	.960	13.41	1875
9	1200	276.4	35	56	12.0	14.4	1482	1.570	13.56	1750
10	1200	301.0	38	5	14.4	12.8	2248	5.050	11.47	625
11	600	0.0	0	957	1.6	15.9	2792	.850	12.79	65
12	1200	0.0	0	569	1.6	15.4	66439	.520	5.89	16
13	2300	344.4	83	5	25.8	11.8	2243	7.120	10.42	650
14	2300	311.8	75	58	24.4	14.2	1120	1.870	13.56	1525
15	2300	271.2	65	104	21.4	14.5	958	1.170	13.98	2200
16	2300	252.2	61	142	20.1	14.4	1027	1.230	13.98	2050
17	2300	169.5	41	267	15.7	14.2	1063	1.720	13.70	1000
18	2300	84.8	21	373	11.5	14.7	410	.940	14.12	775
19	2300	59.7	14	411	10.1	14.8	273	.850	14.12	565
20	2300	27.1	7	452	8.5	14.8	842	1.040	13.83	310
21	2300	6.8	2	478	7.2	15.3	657	.850	13.56	175
22	600	0.0	0	447	1.6	16.1	2475	.990	13.01	64
23	2300	0.0	0	615	1.5	15.8	57927	.990	6.52	15

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	40.5	119	2.5	.070	0	3.6	R	R	R
2	9.1	184	16.0	.060	4	9.7	13.32	270.1	23.5
3	8.3	240	20.9	.060	18	10.7	2.71	78.2	6.8
4	11.9	324	42.1	.050	40	12.5	1.67	47.6	6.2
5	21.9	442	69.9	.030	56	14.3	2.24	46.3	7.3
6	51.9	870	208.2	.060	112	18.7	2.70	45.6	10.9
7	65.7	604	419.1	0.000	167	22.7	2.31	21.2	14.7
8	77.5	742	447.3	.090	182	24.6	2.50	23.9	16.0
9	116.6	2495	457.1	0.000	209	26.5	3.35	71.8	13.2
10	193.0	8760	178.2	0.000	222	31.7	5.10	231.6	4.7
11	32.9	202	2.5	.070	0	3.6	R	R	R
12	831.1	131	.7	.120	0	3.6	R	R	R
13	325.3	20860	313.0	.025	254	56.8	3.92	251.5	3.8
14	175.5	5920	793.5	.055	230	53.7	2.34	78.1	10.6
15	134.2	3312	1023.5	.035	200	47.1	2.05	50.7	15.7
16	135.0	3268	895.2	.060	186	44.4	2.22	53.8	14.7
17	107.7	3522	336.6	.060	125	34.7	2.64	86.3	8.2
18	31.2	1443	195.5	0.000	64	25.3	1.49	69.0	9.4
19	18.3	1153	126.0	.065	44	22.2	1.28	80.2	8.8
20	47.7	1192	58.4	0.000	20	18.7	7.31	182.4	8.9
21	32.7	855	28.9	0.000	5	15.9	20.06	523.9	17.7
22	29.4	118	2.5	.080	0	3.6	R	R	R
23	677.3	116	.6	.060	0	3.3	R	R	R

CYCLE COMPOSITE	HC	10.373	GRAM/ KW HR	(7.735 BS)
	CO	87.268	GRAM/ KW HR	(65.076 BS)
	NOX	11.135	GRAM/ KW HR	(8.303 BS)
	SFC	.436	KG/ KW HR	(.716 BS)
CORRECTED	NOX	10.923	GRAM/ KW HR	(8.145 BS)

TABLE B-30. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-2 TEST-203 RUN-2 CHEV. 350 BASELINE 03-18-76

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	442	1.6	16.3	2918	.490	12.74	63
2	1200	5.4	1	417	4.4	17.2	459	.320	12.47	138
3	1200	24.4	3	396	4.7	17.1	353	.320	12.60	163
4	1200	54.2	7	353	5.4	16.9	336	.320	12.74	290
5	1200	73.2	9	328	6.0	16.4	427	.400	13.01	420
6	1200	151.9	19	229	8.0	15.4	759	.730	13.56	1075
7	1200	227.8	29	86	10.1	16.1	856	.380	13.28	1600
8	1200	246.8	31	63	10.9	15.4	1064	.670	13.56	1850
9	1200	273.9	34	56	12.1	13.9	1670	2.420	13.14	1325
10	1200	301.0	38	5	14.7	12.3	2292	6.270	10.76	563
11	600	0.0	0	457	1.5	16.0	2476	.550	13.01	66
12	1200	0.0	0	569	1.5	16.1	61677	.490	5.89	15
13	2300	344.4	83	5	26.0	12.0	2248	7.210	9.97	625
14	2300	311.8	75	58	24.4	12.0	2112	7.040	10.31	420
15	2300	279.3	67	104	21.2	14.5	1072	1.170	13.98	2175
16	2300	254.9	61	142	19.8	14.5	1095	1.170	13.98	2100
17	2300	168.1	40	267	15.1	14.3	1096	1.500	13.83	1325
18	2300	84.1	20	373	11.1	14.8	387	.790	14.12	725
19	2300	62.4	15	411	9.8	14.9	319	.790	14.12	530
20	2300	27.1	7	452	8.3	14.9	284	1.040	13.83	300
21	2300	6.8	2	478	7.8	15.1	227	.970	13.70	213
22	600	0.0	0	447	1.6	16.2	2831	.460	12.87	67
23	2300	0.0	0	615	1.5	15.6	59306	.520	6.52	17

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	34.3	116	2.5	.070	0	3.5	R	R	R
2	15.7	222	15.7	.060	4	9.7	23.06	325.1	23.0
3	12.8	235	19.7	.060	18	10.4	4.19	76.7	6.4
4	14.0	269	40.0	.050	40	12.0	2.05	39.4	5.9
5	19.0	360	62.1	.030	54	13.2	2.07	39.1	6.7
6	42.4	824	199.5	.060	112	17.7	2.22	43.2	10.5
7	63.0	565	390.9	0.000	168	22.3	2.20	19.7	13.7
8	80.8	1028	466.4	.040	182	24.0	2.60	33.1	15.0
9	128.6	3764	338.8	0.000	202	26.7	3.74	109.4	9.8
10	195.8	10818	159.7	0.000	222	32.5	5.18	286.0	4.2
11	27.7	124	2.4	.070	0	3.4	R	R	R
12	735.8	118	.6	.120	0	3.3	R	R	R
13	335.7	21749	309.9	.025	254	57.3	4.05	262.2	3.7
14	293.0	19725	193.4	.055	230	53.7	3.90	262.6	2.6
15	148.8	3281	1002.6	.035	206	46.7	2.21	48.8	14.9
16	142.2	3070	905.7	.060	188	43.7	2.32	50.0	14.8
17	107.6	2973	731.7	.060	124	33.4	2.66	73.4	10.7
18	28.6	1182	178.2	0.000	62	24.4	1.41	58.4	8.8
19	21.0	1051	115.9	.065	46	21.7	1.40	70.0	7.7
20	15.8	1170	55.5	0.000	20	18.3	2.43	179.2	8.5
21	12.0	1034	37.3	0.000	5	17.1	7.34	633.5	22.9
22	34.0	111	2.7	.080	0	3.6	R	R	R
23	684.4	121	.7	.060	0	3.3	R	R	R

CYCLE COMPOSITE HC 10.131 GRAM/ KW HR (7.555 BS)
CO 125.226 GRAM/ KW HR (93.381 BS)
NOX 9.458 GRAM/ KW HR (7.053 BS)
SFC .424 KG/ KW HR (.697 BS)
CORRECTED NOX 9.033 GRAM/ KW HR (6.736 BS)

TABLE B-31. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-2 TEST-203 RUN-3 CHEV. 350 BASELINE 03-18-76

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	447	1.2	15.3	2397	1.100	13.01	63
2	1200	5.4	1	417	4.3	16.8	336	.380	12.74	133
3	1200	23.0	3	378	4.4	17.7	245	.210	12.21	138
4	1200	51.5	6	335	5.9	17.4	223	.210	12.47	230
5	1200	74.6	9	325	6.1	16.3	383	.430	13.14	400
6	1200	149.1	19	224	8.4	15.4	860	.730	13.56	940
7	1200	222.4	28	76	10.2	16.1	834	.380	13.28	1425
8	1200	244.0	31	61	10.9	15.7	949	.610	13.41	1625
9	1200	273.9	34	56	12.2	13.3	1975	3.810	12.21	760
10	1200	301.0	38	3	15.3	12.4	2312	5.980	10.88	600
11	600	0.0	0	462	1.6	15.8	2164	.730	13.01	63
12	1200	0.0	0	564	1.5	15.5	64478	.490	6.05	15
13	2300	339.0	82	10	26.1	11.9	2509	7.040	10.92	550
14	2300	306.4	74	63	24.3	12.0	2274	6.570	10.76	900
15	2300	273.9	66	107	21.9	14.6	1139	1.100	13.98	1875
16	2300	252.2	61	147	19.8	14.7	1184	1.100	13.83	1850
17	2300	168.1	40	259	15.6	14.3	1165	1.500	13.83	1200
18	2300	86.8	21	353	11.8	14.8	455	.790	14.12	650
19	2300	59.7	14	391	10.4	14.9	341	.730	14.12	500
20	2300	27.1	7	442	8.8	14.9	273	.970	13.83	270
21	2300	8.1	2	462	7.9	15.1	227	.970	13.70	188
22	600	0.0	0	447	1.6	15.7	2707	.550	13.28	64
23	2300	0.0	0	610	1.6	15.4	61335	.490	6.52	15

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	20.5	190	1.8	.070	0	2.7	R	R	R
2	11.0	251	14.5	.060	4	9.5	16.17	369.0	21.2
3	8.7	150	16.2	.060	17	9.7	2.99	51.8	5.6
4	10.4	197	35.4	.050	38	13.0	1.60	30.4	5.5
5	17.2	341	59.8	.030	55	13.5	1.84	41.7	6.4
6	50.2	861	182.2	.060	110	18.5	2.68	45.9	9.7
7	61.6	567	349.8	0.000	164	22.4	2.21	20.3	12.5
8	73.2	950	416.1	.040	180	24.0	2.39	31.0	13.6
9	149.1	5812	190.5	0.000	202	27.0	4.33	168.9	5.5
10	207.4	10836	178.7	0.000	222	33.8	5.48	286.5	4.7
11	24.6	168	2.4	.070	0	3.5	R	R	R
12	765.6	118	.6	.120	0	3.4	R	R	R
13	370.1	20979	269.4	.025	250	57.6	4.53	257.0	3.3
14	314.3	18344	183.6	.055	226	53.5	4.26	248.5	2.5
15	160.2	3124	875.3	.035	202	47.1	2.43	47.4	13.3
16	155.6	2920	807.2	.060	186	43.6	2.56	48.1	13.3
17	117.7	3061	402.5	.060	129	34.4	2.91	75.6	9.9
18	35.9	1258	170.2	0.000	64	26.0	1.72	60.2	8.1
19	23.9	1034	116.4	.065	44	23.0	1.66	71.9	8.1
20	16.1	1157	52.9	0.000	20	19.3	2.47	177.1	8.1
21	12.2	1053	33.5	0.000	6	17.4	6.23	537.2	17.1
22	30.5	125	2.4	.080	0	3.5	R	R	R
23	740.9	120	.6	.060	0	3.5	R	R	R

CYCLE COMPOSITE	HC	10.769	GRAM/ KW HR	(8.031 BS)
	CO	121.606	GRAM/ KW HR	(90.681 BS)
	NOX	8.671	GRAM/ KW HR	(6.466 BS)
	SFC	.935	KG/ KW HR	(.715 BS)
CORRECTED	NOX	9.201	GRAM/ KW HR	(6.862 BS)

TABLE B-32. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-2 TEST-204 RUN-1 03-19-76 CHEV. 350 BASELINE K= 1.024 HUM= 11.9 G/KG

		CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				VAC.
MODE	RPM	HC-FID	CO	CO2	NOx-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOx-CL	CKW	MM
1	2000	2100	2.210	10.31	510	17.764	26993	370	22090	257	370.1	22090	263.0	68.9	15
2	2700	980	1.470	13.83	1550	15.912	23996	171	4527	785	170.5	4527	803.5	66.5	152
3	2700	920	1.870	13.56	760	15.535	15377	109	3739	250	109.1	3739	255.8	31.7	330
4	1100	200	.290	12.40	197	13.912	9763	8	216	24	8.3	216	24.7	4.4	356
5	1100	17600	.270	9.66	35	11.852	2812	456	129	3	456.0	129	2.8	0.0	483
6	1100	67890	.900	5.74	19	13.908	1997	806	91	1	806.3	91	.5	0.0	561

		-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE--------							---CALC---		-------G/KW HR------			SFC
MODE	ID	MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	HC	CO	NOX	KG/KW HR
1		.6	91.7	291	59.9	4.05	241.70	2.81	.648	11.8	.085	5.93	329.13	3.77	.399
2		6.0	89.2	179	51.8	1.93	51.20	8.87	.581	14.3	.070	2.59	68.66	11.90	.353
3		13.0	92.5	83	33.9	2.47	88.69	5.92	.747	14.2	.071	3.31	118.98	7.99	.485
4		19.0	5.9	28	10.5	1.91	36.84	9.11	1.774	17.1	.058	1.89	99.91	5.52	1.079
5		19.0	0.0	0	6.2	R	R	R	R	18.1	.055	R	R	R	R
6		22.1	0.0	0	3.3	R	R	R	R	15.0	.067	R	R	R	R

ID =

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-2 TEST-204 RUN-2 03-19-76 CHEV. 350 BASELINE K= 1.029 HUM= 12.1 G/KG

		CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				VAC.
MODE	RPM	HC-FID	CO	CO2	NOx-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOx-CL	CKW	MM
1	2000	2600	2.960	10.20	490	17.893	26399	393	22233	249	393.3	22233	247.1	68.7	15
2	2700	990	1.590	13.83	1575	15.966	23340	195	4699	790	194.9	4699	813.1	67.3	152
3	2700	870	1.980	13.56	625	15.690	15609	99	3990	207	99.3	3990	213.1	32.5	330
4	1100	150	.380	12.79	195	13.137	9763	6	278	23	6.1	278	24.2	4.1	356
5	1100	21990	.320	9.19	33	11.792	2995	493	137	2	493.3	137	2.9	0.0	483
6	1100	67200	.930	5.74	15	13.278	1598	850	104	1	849.6	104	.6	0.0	561

		-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE--------							---CALC---		-------G/KW HR------			SFC
MODE	ID	MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	HC	CO	NOX	KG/KW HR
1		.6	92.1	292	58.2	3.76	243.27	2.63	.632	11.7	.086	5.09	326.23	3.52	.389
2		6.0	90.3	176	51.5	1.42	52.53	8.93	.571	14.3	.070	2.17	70.44	11.84	.367
3		13.0	93.6	85	34.4	2.30	92.91	4.79	.788	14.1	.071	3.08	123.92	6.93	.490
4		19.0	5.5	26	10.5	1.12	51.10	9.31	1.911	14.8	.059	1.50	68.53	5.78	1.163
5		19.0	0.0	0	5.5	R	R	R	R	18.0	.055	R	R	R	R
6		22.1	0.0	0	3.5	R	R	R	R	15.0	.067	R	R	R	R

ID =

TABLE B-33. MASS EMISSIONS BY NINE-MODE FTP -METRIC UNITS

ENGINE-2 TEST-210 RUN-1 BASELINE CARB. 6606 05-19-76 K = .871 HUM = 6.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NO2	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NO2-CL	KW	HP
1 IDLE	2722	.125	14.34	66	14.788	1769	33	30	3	.232	7.6	7	.6	0	0
2 16 MG	727	.590	14.08	370	14.692	8709	93	646	73	.077	3.3	50	5.6	11	15
3 10 MG	865	.376	14.59	1444	15.002	13608	78	688	936	.147	11.5	101	64.1	33	45
4 16 MG	455	.461	14.34	470	14.846	8709	27	544	91	.077	2.0	42	7.0	11	15
5 19 MG	317	.216	13.93	140	14.177	5806	13	178	19	.057	.7	10	1.1	0	0
6 16 MG	523	.461	14.34	430	14.903	8709	31	544	83	.077	2.4	42	6.4	11	15
7 3 MG	725	.143	14.23	2177	14.445	18960	45	504	445	.113	10.7	58	106.8	57	76
8 16 MG	501	.613	14.34	460	15.053	8709	29	717	88	.077	2.2	55	6.8	11	15
9 C.T.	39833	.350	4.22	22	13.053	1633	436	88	1	.143	62.3	13	.1	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											6.4	25	13.4		
1 IDLE	2828	.147	13.07	68	13.500	1769	37	34	3	.232	8.6	8	.7	0	0
2 16 MG	433	.613	14.23	400	14.936	8709	54	722	77	.077	4.2	56	6.0	11	15
3 10 MG	456	.389	14.54	1505	15.024	13608	87	711	453	.147	12.7	105	66.5	33	45
4 16 MG	546	.674	14.23	470	14.454	8709	32	793	41	.077	2.4	61	7.0	11	15
5 19 MG	339	.325	13.78	135	14.138	5806	19	269	18	.057	.8	15	1.0	0	0
6 16 MG	500	.583	14.23	450	14.863	8709	29	690	88	.077	2.3	53	6.7	11	15
7 3 MG	772	.170	14.34	2230	14.637	18960	100	445	459	.113	11.3	50	108.4	57	76
8 16 MG	525	.690	14.54	500	15.283	8709	30	795	45	.077	2.3	61	7.3	11	15
9 C.T.	31461	.350	4.44	22	13.136	1633	341	88	1	.143	55.4	13	.1	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											6.8	28	13.7		
1 IDLE	1683	.136	13.07	65	13.375	1769	22	34	3	.232	5.2	8	.7	0	0
2 16 MG	457	.539	14.54	430	15.175	8709	55	625	82	.077	4.2	48	6.3	11	15
3 10 MG	434	.376	14.70	1444	15.169	13608	84	680	445	.147	12.3	100	65.4	33	45
4 16 MG	543	.690	14.34	450	15.134	8709	34	802	86	.077	2.6	62	6.6	11	15
5 19 MG	283	.287	13.93	145	14.246	5806	12	237	20	.057	.7	13	1.1	0	0
6 16 MG	478	.442	14.54	470	15.030	8709	28	517	90	.077	2.1	40	7.0	11	15
7 3 MG	772	.143	14.34	2145	14.660	18960	100	503	443	.113	11.3	57	106.5	57	76
8 16 MG	456	.613	14.54	460	15.144	8709	26	710	88	.077	2.0	55	6.7	11	15
9 C.T.	30704	.337	4.43	21	12.838	1633	341	87	1	.143	55.4	12	.1	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											6.5	27	13.5		
1 IDLE	2817	.147	14.54	56	14.464	1769	33	35	2	.232	7.7	8	.5	0	0
2 16 MG	410	.447	14.34	450	14.478	8709	53	584	87	.077	4.1	45	6.7	11	15
3 10 MG	456	.389	14.54	1505	15.024	13608	87	711	453	.147	12.7	105	66.5	33	45
4 16 MG	615	.443	14.34	450	15.095	8709	35	750	86	.077	2.7	58	6.6	11	15
5 19 MG	317	.239	13.93	140	14.201	5806	13	198	19	.057	.7	11	1.1	0	0
6 16 MG	501	.569	14.54	430	15.154	8709	29	660	82	.077	2.2	51	6.3	11	15
7 3 MG	773	.176	14.54	2230	14.743	18960	99	454	444	.113	11.2	51	107.2	57	76
8 16 MG	478	.613	14.34	480	15.051	8709	28	717	92	.077	2.1	55	7.1	11	15
9 C.T.	30707	.350	4.43	21	12.851	1633	340	90	1	.143	55.8	13	.1	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											6.7	27	13.6		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)----------											6.9	27	13.6		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 9)----------											6.6	27	13.6		

FOUR CYCLE COMPOSITE -

HC- FID 0.35(6.9) + 0.65(6.6) = 6.685 G/ KW HR (4.985 GS)

CO- NDIR 0.35(27.0) + 0.65(26.7) = 26.748 G/ KW HR (19.983 GS)

NO2-CL 0.35(13.6) + 0.65(13.6) = 13.569 G/ KW HR (10.119 GS)

CORRECTED NO2 = 11.821 G/ KW HR (8.815 GS)

SFC = .526 KG/ KW HR (.864 GS)

TABLE B-34. MASS EMISSIONS BY NINE-MODE FTP -METRIC UNITS

ENGINE-2 TEST-210 RUN-2 BASELINE CARB. 6606 05-19-76 K = .889 HUM = 6.6 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NO2	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NO2-CL	KW	HP
1 IDLE	2090	.131	12.93	67	13.265	1905	29	38	3	.232	6.8	9	.7	0	0
2 16 MG	709	.590	19.08	990	19.690	8709	92	696	87	.077	3.2	50	6.7	11	15
3 10 MG	738	.350	19.23	1960	19.659	13653	69	658	952	.197	10.1	97	66.9	39	96
9 16 MG	959	.771	13.93	990	19.796	8709	27	920	86	.077	2.1	71	6.6	11	15
5 19 MG	203	.275	13.69	190	13.936	5761	8	230	19	.057	.5	13	1.1	0	0
6 16 MG	932	.613	19.23	950	19.886	8709	25	725	87	.077	1.9	56	6.7	11	15
7 3 MG	639	.181	19.08	2195	19.325	19233	85	991	978	.113	9.6	56	110.6	57	76
8 16 MG	369	.598	19.23	990	19.865	8709	21	708	95	.077	1.6	55	7.3	11	15
9 C.T.	30653	.350	9.22	22	12.635	1905	962	107	1	.193	66.1	15	.2	0	0
											6.8	28	13.8		
	-CYCLE COMPOSITE IN G / KW HR-														
1 IDLE	2299	.136	13.07	65	13.931	1905	32	39	3	.232	7.9	9	.7	0	0
2 16 MG	705	.583	19.23	930	19.884	8709	91	689	89	.077	3.2	53	6.9	11	15
3 10 MG	728	.955	19.39	1960	19.918	13653	67	892	999	.197	9.8	129	65.2	39	96
9 16 MG	501	.693	19.23	960	19.924	8709	29	759	89	.077	2.2	58	6.9	11	15
5 19 MG	226	.251	13.78	150	19.059	5761	9	208	20	.057	.5	12	1.2	0	0
6 16 MG	977	.613	19.08	960	19.791	8709	28	732	90	.077	2.2	56	6.9	11	15
7 3 MG	703	.198	19.23	2195	19.999	19233	93	532	967	.113	10.5	60	109.2	57	76
8 16 MG	932	.613	19.23	960	19.886	8709	25	725	89	.077	1.9	56	6.9	11	15
9 C.T.	27910	.325	9.93	23	12.595	1905	929	100	1	.193	60.6	19	.2	0	0
											6.6	30	13.6		
	-CYCLE COMPOSITE IN G / KW HR-														
1 IDLE	2020	.197	13.07	56	13.920	1905	29	92	3	.232	6.7	10	.6	0	0
2 16 MG	726	.679	13.93	950	19.677	8709	93	808	89	.077	3.3	62	6.8	11	15
3 10 MG	795	.955	19.23	1937	19.765	13653	79	851	991	.197	10.8	125	69.8	39	96
9 16 MG	500	.613	19.23	970	19.893	8709	29	729	91	.077	2.3	56	7.0	11	15
5 19 MG	270	.227	13.99	120	13.799	5761	11	193	17	.057	.6	11	1.0	0	0
6 16 MG	959	.613	19.08	950	19.739	8709	27	732	88	.077	2.1	56	6.8	11	15
7 3 MG	702	.187	19.08	2213	19.337	19233	99	506	986	.113	10.6	57	111.9	57	76
8 16 MG	909	.690	19.08	980	19.811	8709	29	820	99	.077	1.9	63	7.2	11	15
9 C.T.	27866	.350	9.22	22	12.356	1905	930	109	1	.193	61.9	16	.2	0	0
											6.7	31	13.8		
	-CYCLE COMPOSITE IN G / KW HR-														
1 IDLE	2292	.125	12.93	52	13.280	1905	32	36	2	.232	7.5	8	.6	0	0
2 16 MG	749	.569	19.08	960	19.724	8709	99	679	90	.077	3.9	52	7.0	11	15
3 10 MG	818	.915	19.23	1915	19.727	13653	76	777	936	.197	11.1	119	69.0	39	96
9 16 MG	977	.613	19.08	980	19.791	8709	28	732	99	.077	2.2	56	7.2	11	15
5 19 MG	298	.287	13.69	125	13.952	5761	10	290	17	.057	.6	19	1.0	0	0
6 16 MG	999	.679	13.93	950	19.659	8709	30	810	89	.077	2.3	62	6.8	11	15
7 3 MG	679	.209	19.08	2213	19.352	19233	91	552	985	.113	10.3	62	111.3	57	76
8 16 MG	955	.771	19.08	980	19.896	8709	27	910	93	.077	2.0	70	7.2	11	15
9 C.T.	27866	.350	9.22	22	12.356	1905	930	109	1	.193	61.9	16	.2	0	0
											6.8	31	13.8		
	-CYCLE COMPOSITE IN G / KW HR-														
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)----------											6.7	29	13.7		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 9)----------											6.7	31	13.8		

FOUR CYCLE COMPOSITE -

HC- FID 0.35(6.7) + 0.65(6.7) = 6.717 G/ KW HR (5.009 BS)

CO- NDIR 0.35(28.9) + 0.65(30.5) = 29.975 G/ KW HR (22.353 BS)

NO2-CL 0.35(13.7) + 0.65(13.8) = 13.760 G/ KW HR (10.261 BS)

CORRECTED NO2 = 12.226 G/ KW HR (9.117 BS)

SFC = .530 KG/ KW HR (.871 BS)

TABLE B-35. MASS EMISSIONS BY NINE-MODE FTP -METRIC UNITS

ENGINE-2 TEST-210 RUN-3 BASELINE CARB. 6606 05-19-76 K = .859 HUM = 5.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NO2	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NO2-CL	KW	HP
1 IDLE	2503	.170	12.52	66	12.990	1769	39	97	3	.232	7.9	11	.7	0	0
2 16 MG	568	.525	19.08	990	19.662	8800	39	637	88	.077	2.6	99	6.8	11	15
3 10 MG	773	.389	19.39	1527	19.856	14016	73	741	978	.197	10.7	109	70.3	39	96
4 16 MG	959	.738	13.78	980	19.564	8800	27	901	96	.077	2.1	69	7.9	11	15
5 19 MG	181	.263	13.69	190	13.921	5988	8	229	20	.057	.9	13	1.1	0	0
6 16 MG	908	.613	13.93	950	19.589	8800	25	797	90	.077	1.9	58	6.9	11	15
7 3 MG	679	.193	19.08	2230	19.391	19278	91	523	995	.113	10.3	59	112.5	57	76
8 16 MG	910	.738	19.23	500	15.009	8800	29	879	97	.077	1.9	67	7.5	11	15
9 C.T.	31300	.376	9.01	23	12.516	1729	931	109	1	.193	61.7	15	.2	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											6.7	30	19.3		
1 IDLE	1797	.131	13.21	67	13.521	1769	29	35	3	.232	5.5	8	.7	0	0
2 16 MG	727	.690	19.08	950	19.893	8800	93	827	89	.077	3.3	64	6.8	11	15
3 10 MG	795	.961	19.23	1960	19.771	14016	75	889	960	.197	11.1	130	67.6	39	96
4 16 MG	977	.613	19.08	990	19.791	8800	28	739	97	.077	2.2	57	7.5	11	15
5 19 MG	226	.363	13.78	150	19.165	5988	10	310	21	.057	.5	18	1.2	0	0
6 16 MG	955	.690	19.08	990	19.816	8800	27	828	97	.077	2.1	64	7.9	11	15
7 3 MG	793	.216	19.08	2230	19.375	19278	106	584	993	.113	12.0	66	112.2	57	76
8 16 MG	910	.613	19.39	525	15.099	8800	29	729	102	.077	1.8	56	7.9	11	15
9 C.T.	28563	.350	9.22	22	12.926	1729	396	98	1	.193	56.7	19	.1	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											6.9	32	19.2		
1 IDLE	2199	.131	13.07	56	13.921	1769	29	35	2	.232	6.7	8	.6	0	0
2 16 MG	727	.613	19.08	930	19.766	8800	93	738	85	.077	3.3	57	6.6	11	15
3 10 MG	892	.961	19.39	1971	19.935	14016	79	879	958	.197	11.6	128	67.9	39	96
4 16 MG	955	.722	19.08	990	19.897	8800	27	869	87	.077	2.1	67	6.7	11	15
5 19 MG	237	.312	13.69	190	13.976	5988	10	270	20	.057	.6	15	1.1	0	0
6 16 MG	959	.679	13.93	930	19.650	8800	27	818	86	.077	2.1	63	6.6	11	15
7 3 MG	679	.216	19.08	2230	19.369	19278	91	585	999	.113	10.3	66	112.8	57	76
8 16 MG	955	.706	19.08	980	19.832	8800	27	846	95	.077	2.1	65	7.3	11	15
9 C.T.	27167	.337	9.22	22	12.279	1729	382	96	1	.193	54.6	19	.1	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											6.3	32	19.0		
1 IDLE	853	.125	13.07	52	13.281	1769	11	39	2	.232	2.6	8	.5	0	0
2 16 MG	728	.559	19.23	980	19.857	8800	93	663	99	.077	3.3	51	7.3	11	15
3 10 MG	899	.961	19.39	1999	19.991	14016	89	879	951	.197	12.9	128	66.3	39	96
4 16 MG	500	.659	19.08	970	19.789	8800	30	792	93	.077	2.3	61	7.1	11	15
5 19 MG	237	.239	13.78	150	19.093	5988	10	206	21	.057	.6	12	1.2	0	0
6 16 MG	959	.613	19.08	970	19.739	8800	27	739	93	.077	2.1	57	7.2	11	15
7 3 MG	860	.210	19.08	2298	19.376	19278	115	569	1001	.113	13.0	64	113.1	57	76
8 16 MG	956	.809	19.23	960	15.080	8800	27	998	89	.077	2.0	73	6.9	11	15
9 C.T.	26973	.350	9.22	21	12.217	1729	379	100	1	.193	53.9	19	.1	0	0
----------CYCLE COMPOSITE IN G / KW HR----------											6.2	31	19.1		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 1 AND 2)----------											6.5	31	19.2		
AVERAGE SUM---(COMPOSITE VALUES FOR CYCLES 3 AND 9)----------											6.2	32	19.0		

FOUR CYCLE COMPOSITE -

HC- FID 0.35(6.5) + 0.65(6.2) = 6.318 G/ KW HR (9.711 BS)

CO- NDIR 0.35(31.0) + 0.65(31.9) = 31.588 G/ KW HR (23.555 BS)

NO2-CL 0.35(19.2) + 0.65(19.0) = 19.099 G/ KW HR (10.510 BS)

CORRECTED NO2 = 12.103 G/ KW HR (9.025 BS)

SFC = .533 KG/ KW HR (.876 BS)

TABLE B-36. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-02 TEST-211 RUN-02 BASELINE CARB. 4604 05-17-76 K= .992 HUM= 8.4 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	1400	.125	13.07	70	13.352	1588	19	30	3	.232	4.3	7	.6	0.0	492
2 25 PCT T	900	.337	14.08	740	14.962	9614	30	953	154	.077	2.3	35	11.9	16.4	376
3 55 PCT T	640	.376	14.23	1745	14.680	14293	73	736	536	.197	10.7	108	78.8	38.9	231
4 25 PCT T	300	.337	14.08	750	14.951	9571	23	951	155	.077	1.7	35	12.0	18.3	371
5 10 PCT T	140	.902	13.64	240	14.060	4809	9	393	36	.057	.5	22	2.1	6.3	452
6 25 PCT T	260	.306	13.93	750	14.265	9614	20	916	158	.077	1.5	32	12.2	18.3	371
7 90 PCT T	660	.325	14.23	2591	14.629	19550	100	876	1083	.113	11.3	99	122.4	62.8	69
8 25 PCT T	230	.337	14.23	740	14.593	9253	17	932	147	.077	1.3	33	11.3	18.3	378
9 C.T.	24940	.343	9.43	21	12.515	1749	385	109	1	.193	55.0	15	.1	0.0	605
1 IDLE	2080	.125	13.07	65	13.429	1729	30	33	3	.232	6.9	8	.6	0.0	499
2 25 PCT T	550	.337	14.08	720	14.479	9614	91	952	150	.077	3.2	35	11.5	17.8	371
3 55 PCT T	720	.376	14.23	1786	14.687	14288	80	738	549	.197	11.7	108	79.9	39.6	229
4 25 PCT T	390	.325	14.23	770	14.593	9752	26	938	161	.077	2.0	39	12.9	18.9	368
5 10 PCT T	180	.389	13.64	210	14.099	6577	10	367	31	.057	.5	21	1.8	5.1	455
6 25 PCT T	260	.312	14.08	720	14.421	9843	20	930	154	.077	1.5	33	11.8	18.3	371
7 90 PCT T	660	.325	14.23	2551	14.629	19550	100	876	1067	.113	11.3	99	120.5	62.9	66
8 25 PCT T	290	.325	14.23	730	14.582	9571	18	930	150	.077	1.4	33	11.5	18.9	371
9 C.T.	23640	.363	9.43	21	12.375	1678	350	99	1	.193	50.1	14	.1	0.0	605

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 IDLE	17.9	0.0	0	3.5	R	R	.060	R	600	16.6	9.9	1.8	.2	9.5	0.0
2 25 PCT T	19.8	22.3	59	21.2	.951	7.0	.065	.578	2000	15.9	2.6	9.0	9.7	9.0	6.8
3 55 PCT T	9.1	52.2	137	31.9	.601	10.3	.066	.364	2000	15.1	12.0	28.0	31.9	25.9	30.6
4 25 PCT T	19.4	29.6	46	21.1	.858	6.9	.065	.522	2000	15.9	2.0	9.0	9.8	8.9	7.4
5 10 PCT T	17.8	8.9	22	15.0	1.775	9.3	.063	1.080	2000	15.8	.6	5.8	.8	9.7	1.9
6 25 PCT T	19.4	29.4	46	21.2	.862	6.5	.064	.529	2000	15.6	1.7	8.3	9.8	9.0	7.6
7 90 PCT T	2.7	89.2	220	93.1	.512	13.0	.066	.311	2010	15.2	12.7	25.6	98.7	26.8	38.0
8 25 PCT T	19.9	29.5	46	20.9	.833	6.1	.064	.504	1990	15.2	1.4	8.6	9.5	8.4	7.5
9 C.T.	23.8	0.0	0	3.9	R	R	.059	R	2000	17.0	62.0	3.8	.1	3.1	0.0
1 IDLE	17.5	0.0	0	3.8	R	R	.061	R	650	16.5	7.8	2.0	.2	9.8	0.0
2 25 PCT T	19.4	23.8	63	21.2	.890	6.3	.065	.541	2000	15.3	3.6	9.0	9.6	8.9	7.2
3 55 PCT T	9.0	53.0	139	31.5	.594	10.3	.066	.341	2000	15.1	13.2	28.2	31.9	25.3	30.8
4 25 PCT T	19.5	25.9	67	21.5	.843	6.9	.064	.516	2000	15.2	2.2	8.8	9.0	9.0	7.7
5 10 PCT T	17.9	6.9	18	19.5	2.106	9.5	.063	1.281	1990	15.8	.6	5.9	.7	9.5	1.5
6 25 PCT T	19.4	29.6	46	21.7	.882	6.3	.065	.537	2000	15.9	1.7	8.6	9.7	9.1	7.5
7 90 PCT T	2.4	89.3	220	93.1	.511	12.8	.064	.311	2010	15.2	12.8	25.7	98.2	26.6	37.6
8 25 PCT T	19.4	25.9	67	21.1	.831	6.0	.064	.505	2000	15.3	1.6	8.6	9.6	8.9	7.7
9 C.T.	23.8	0.0	0	3.7	R	R	.058	R	2010	17.2	56.5	3.7	.1	2.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 9.8 21 13.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 9.7 21 13.9

TWO CYCLE COMPOSITE -	HC- FID	0.35(9.8) + 0.65(9.7) =	9.755	G/KW HR	(3.595 G/HP HR)
	CO- NDIR	0.35(20.9) + 0.65(20.4) =	20.663	G/KW HR	(15.408 G/HP HR)
	NOx-CL	0.35(13.6) + 0.65(13.9) =	13.936	G/KW HR	(10.020 G/HP HR)
		HC + NOx =	18.191	G/KW HR	(13.565 G/HP HR)
		SFC =	.960	KG/KW HR	(.723 G/HP HR)

TABLE B-37. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-211 RUN-03 BASELINE CARB. 6604 05-17-76 K= .900 HUM= 7.0 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CRW	VAC. MM
1 IDLE	2900	.115	12.52	48	12.903	1678	35	30	3	.232	8.1	7	.6	0.0	932
2 25 PCT T	600	.337	19.08	690	19.485	9616	45	952	137	.077	3.5	35	10.5	16.1	371
3 55 PCT T	920	.376	19.23	1749	19.710	19920	103	796	513	.197	15.1	110	75.9	39.0	229
4 25 PCT T	500	.312	19.23	720	19.599	9671	37	913	191	.077	2.9	32	10.9	17.7	368
5 10 PCT T	140	.902	13.69	230	19.060	6713	9	387	33	.057	.5	22	1.9	5.7	442
6 25 PCT T	340	.275	13.93	710	19.294	9616	27	375	193	.077	2.1	29	11.0	16.6	371
7 90 PCT T	740	.389	19.23	2511	19.703	19919	111	1036	991	.113	12.5	117	111.9	62.2	63
8 25 PCT T	220	.275	13.93	750	19.230	9935	17	368	199	.077	1.3	28	11.9	16.1	371
9 C.T.	26880	.343	9.22	21	12.509	1678	393	98	1	.193	56.1	19	.1	0.0	599
1 IDLE	2900	.136	12.29	75	13.195	1729	35	34	3	.232	8.1	8	.7	0.0	939
2 25 PCT T	600	.300	19.08	730	19.498	9662	45	905	196	.077	3.5	31	11.2	16.1	371
3 55 PCT T	760	.376	19.23	1745	19.692	19929	85	745	518	.197	12.5	109	76.1	39.0	226
4 25 PCT T	360	.376	13.93	730	19.396	9671	27	506	195	.077	2.1	39	11.2	16.7	368
5 10 PCT T	290	.983	13.69	290	19.150	6809	13	969	39	.057	.7	27	2.0	5.7	952
6 25 PCT T	320	.325	13.93	710	19.291	9671	29	939	192	.077	1.9	39	10.9	16.7	373
7 90 PCT T	680	.325	19.23	2511	19.632	19929	102	869	989	.113	11.5	98	111.7	62.3	66
8 25 PCT T	160	.275	19.23	730	19.523	9935	12	361	192	.077	.9	28	10.9	17.2	373
9 C.T.	26880	.363	9.01	21	12.299	1678	399	100	1	.193	57.0	19	.1	0.0	602

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	.--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.0	0.0	0	3.7	0	0	.059	0	600	17.1	7.9	1.8	.3	9.7	0.0
2 25 PCT T	19.4	21.5	57	21.2	.984	6.9	.065	.598	2000	15.3	3.9	8.8	9.5	8.9	6.8
3 55 PCT T	9.0	52.2	137	31.9	.411	9.9	.066	.371	2000	15.1	19.8	27.9	32.2	25.7	31.5
4 25 PCT T	19.5	23.8	62	21.1	.887	6.0	.066	.539	2000	15.2	2.8	8.1	9.6	8.9	7.5
5 10 PCT T	17.4	7.7	20	14.8	1.928	9.3	.063	1.173	2000	15.8	.5	5.6	.8	9.6	1.8
6 25 PCT T	19.6	22.3	58	21.2	.952	6.5	.069	.579	2000	15.6	2.1	7.3	9.7	8.9	7.0
7 90 PCT T	2.5	83.9	218	42.8	.513	12.0	.066	.312	2010	15.1	12.3	29.7	97.9	26.5	38.6
8 25 PCT T	19.4	21.5	57	20.8	.965	7.0	.069	.587	2000	15.6	1.2	7.2	9.9	8.8	6.8
9 C.T.	23.6	0.0	0	3.7	0	0	.059	0	2000	16.9	55.0	3.6	.1	2.9	0.0
1 IDLE	17.1	0.0	0	3.8	0	0	.060	0	600	14.7	8.3	2.1	.3	9.8	0.0
2 25 PCT T	19.6	21.5	57	21.3	.989	6.8	.065	.602	2000	15.4	3.6	8.8	9.8	9.0	6.8
3 55 PCT T	8.9	52.3	137	31.9	.408	10.0	.066	.370	2000	15.1	12.7	28.2	32.9	25.6	31.5
4 25 PCT T	19.5	22.3	59	21.1	.995	6.6	.065	.575	2000	15.5	2.1	10.0	9.8	8.9	7.0
5 10 PCT T	17.8	7.7	20	15.0	1.955	9.5	.069	1.189	1990	15.7	.8	6.1	.8	9.7	1.8
6 25 PCT T	19.7	22.4	59	21.1	.956	6.9	.069	.574	2000	15.6	1.9	8.7	9.7	8.9	7.0
7 90 PCT T	2.6	83.4	219	42.5	.508	12.0	.066	.309	2010	15.2	11.7	25.1	97.6	24.3	38.6
8 25 PCT T	19.7	23.1	61	20.8	.902	6.2	.065	.548	2000	15.3	.9	7.2	9.6	8.8	7.3
9 C.T.	23.7	0.0	0	3.7	0	0	.058	0	2000	17.2	58.1	3.7	.1	2.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 5.7 22 13.0

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 5.9 22 13.0

TWO CYCLE COMPOSITE -

HC- FID 0.35(5.7) + 0.65(5.9) = 5.820 G/KW HR (9.116 BB)

CO- NDIR 0.35(21.8) + 0.65(21.5) = 21.628 G/KW HR (16.128 BB)

NOX-CL 0.35(13.0) + 0.65(13.0) = 12.999 G/KW HR (9.693 BB)

HC + NOX = 18.819 G/KW HR (13.810 BB)

SFC = .454 KG/KW HR (.796 BB)

TABLE B-38. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-212 RUN-01 BASELINE REPEAT 05-29-76 K= 1.079 HUM= 15.2 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1600	.115	12.52	45	12.813	1860	24	39	3	.232	6.0	8	.8	0.0	927
2 25 PCT T	920	.389	13.93	560	14.366	9888	33	590	138	.077	2.5	92	10.6	17.9	364
3 55 PCT T	720	.955	14.23	1392	14.767	19970	80	901	989	.197	11.8	133	71.8	38.2	229
4 25 PCT T	320	.928	14.23	565	14.695	9616	29	546	132	.077	1.8	44	10.2	17.9	368
5 10 PCT T	200	.559	13.69	220	14.217	7167	11	549	90	.057	.7	32	2.3	6.9	992
6 25 PCT T	300	.992	14.23	560	14.704	9616	22	584	131	.077	1.7	45	10.1	17.9	371
7 90 PCT T	800	.590	14.23	2029	14.960	19192	117	1909	936	.113	13.2	159	105.7	62.0	58
8 25 PCT T	300	.990	14.23	580	14.754	9571	22	602	135	.077	1.7	44	10.9	17.9	368
9 C.T.	31360	.363	9.01	20	12.280	1860	496	107	1	.193	70.9	15	.1	0.0	605
1 IDLE	1880	.159	12.79	60	13.159	1819	29	94	3	.232	6.7	10	.7	0.0	927
2 25 PCT T	590	.992	14.23	530	14.733	9525	90	577	123	.077	3.1	44	9.5	17.9	373
3 55 PCT T	790	.511	14.23	1369	14.830	19197	85	788	969	.197	12.5	195	69.0	38.3	231
4 25 PCT T	380	.992	14.23	565	14.715	9525	28	570	129	.077	2.2	44	9.9	17.9	371
5 10 PCT T	240	.613	13.69	210	14.283	7212	15	525	38	.057	.8	36	2.2	6.9	992
6 25 PCT T	390	.992	14.23	560	14.710	9671	25	581	130	.077	1.9	45	10.0	17.9	371
7 90 PCT T	1180	1.219	14.23	1999	15.589	19550	169	3090	853	.113	19.1	349	96.9	62.7	56
8 25 PCT T	320	.990	14.23	570	14.754	9525	23	639	132	.077	1.8	44	10.1	17.9	371
9 C.T.	31360	.363	9.01	19	12.280	1819	984	109	1	.193	69.2	15	.1	0.0	605

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	16.8	0.0	0	9.1	R	R	.058	R	600	17.2	5.5	1.5	.9	5.2	0.0
2 25 PCT T	19.9	23.3	41	21.8	.934	6.0	.065	.570	2000	15.5	2.3	7.9	9.8	9.1	7.3
3 55 PCT T	9.0	51.2	139	31.9	.623	9.7	.064	.379	2000	15.0	10.7	25.2	32.3	25.9	30.5
4 25 PCT T	19.5	23.1	43	21.2	.881	5.6	.064	.536	2000	15.1	1.7	8.3	9.6	8.8	7.5
5 10 PCT T	17.9	8.5	22	15.8	1.899	9.7	.064	1.125	2000	15.6	.6	6.1	1.0	9.9	2.0
6 25 PCT T	19.6	23.3	41	21.2	.910	5.7	.064	.553	2000	15.1	1.6	8.5	9.5	8.8	7.3
7 90 PCT T	2.3	83.2	218	42.2	.507	11.5	.067	.309	2000	19.9	12.0	30.2	47.6	25.8	38.1
8 25 PCT T	19.5	23.3	41	21.1	.909	5.9	.066	.550	2000	15.1	1.5	9.9	9.7	8.8	7.3
9 C.T.	23.8	0.0	0	9.1	R	R	.061	R	2000	16.5	69.3	2.9	.1	3.2	0.0
1 IDLE	16.8	0.0	0	9.0	R	R	.060	R	600	16.8	5.7	1.9	.3	5.1	0.0
2 25 PCT T	19.7	23.3	41	21.9	.900	5.9	.066	.567	2000	15.1	2.6	6.0	9.5	8.8	7.3
3 55 PCT T	9.1	51.9	135	31.3	.609	9.3	.067	.371	2000	15.0	10.6	19.7	33.2	25.1	30.5
4 25 PCT T	19.6	23.3	41	21.0	.900	5.6	.066	.547	2000	15.1	1.8	6.0	9.8	8.8	7.3
5 10 PCT T	17.9	8.6	22	15.9	1.858	9.5	.069	1.130	2000	15.5	.7	9.8	1.0	9.9	2.0
6 25 PCT T	19.6	23.3	41	21.1	.905	5.7	.066	.550	2000	15.1	1.6	6.1	9.8	8.9	7.3
7 90 PCT T	2.2	89.0	221	43.1	.513	10.9	.070	.312	2000	19.2	16.3	47.3	46.9	26.5	38.9
8 25 PCT T	19.6	23.3	41	21.0	.900	5.8	.066	.547	2000	15.1	1.5	6.7	9.9	8.8	7.3
9 C.T.	23.8	0.0	0	9.0	R	R	.061	R	2000	16.5	59.0	2.0	.1	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------				6.1	29	12.3
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------				6.5	41	11.5
TWO CYCLE COMPOSITE - HC- FID 0.35(6.1) + 0.65(6.5) =	6.369	G/KW	HR	(9.799 AS)		
CO- NDIR 0.35(29.2) + 0.65(40.9) =	36.793	G/KW	HR	(27.937 AS)		
NOX-CL 0.35(12.3) + 0.65(11.5) =	11.803	G/KW	HR	(8.801 AS)		
HC + NOX =	18.171	G/KW	HR	(13.550 AS)		
SFC =	.957	KG/KW	HR	(.795 AS)		

TABLE B-39. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-212 RUN-02 BASELINE REPEAT 05-29-76 K= 1.053 HUM= 13.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1140	.125	12.79	42	13.095	1769	18	39	3	.232	4.1	8	.7	0.0	927
2 25 PCT T	340	.992	14.08	555	14.563	9662	27	592	129	.077	2.1	46	9.9	17.9	371
3 55 PCT T	720	.525	14.23	1218	14.837	19288	79	1022	910	.197	11.6	150	60.3	38.9	231
4 25 PCT T	300	.969	14.23	500	14.733	9616	22	618	114	.077	1.7	48	8.8	17.9	373
5 10 PCT T	230	.771	13.44	210	14.437	7212	17	778	37	.057	.7	44	2.1	6.9	444
6 25 PCT T	280	.949	14.08	550	14.581	9616	21	625	127	.077	1.6	48	9.8	17.5	373
7 90 PCT T	1200	1.396	13.93	1786	15.963	19777	175	3606	799	.113	19.8	407	90.3	62.9	58
8 25 PCT T	300	.569	14.08	530	14.683	9880	22	792	120	.077	1.7	57	9.2	17.5	371
9 C.T.	29800	.356	9.01	19	12.994	1769	993	102	1	.193	63.9	15	.1	0.0	605
1 IDLE	1600	.136	12.79	47	13.104	1729	29	36	2	.232	5.5	8	.5	0.0	917
2 25 PCT T	540	.590	14.08	555	14.683	9252	42	724	129	.077	3.3	56	9.9	17.5	371
3 55 PCT T	790	.583	14.08	1358	14.753	19293	87	1138	958	.197	12.7	167	67.9	38.9	234
4 25 PCT T	370	.955	13.93	540	14.927	9525	28	607	129	.077	2.1	47	10.0	17.5	373
5 10 PCT T	200	.669	13.79	180	14.272	6895	11	458	30	.057	.6	26	1.7	6.9	447
6 25 PCT T	340	.957	13.93	570	14.968	9662	27	670	133	.077	2.1	52	10.2	17.5	373
7 90 PCT T	1920	2.390	13.49	1915	15.993	20366	207	6019	630	.113	23.9	680	71.2	63.5	58
8 25 PCT T	300	.525	14.08	570	14.639	9525	22	690	130	.077	1.7	53	10.0	17.5	373
9 C.T.	30080	.350	8.91	18	12.525	1769	961	100	1	.193	66.0	19	.1	0.0	607

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	RSFC	RSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	16.8	0.0	0	3.9	R	R	.059	R	600	16.9	3.8	1.0	.9	9.9	0.0
2 25 PCT T	19.4	23.9	41	21.3	.912	5.6	.066	.555	2000	15.3	2.0	5.5	5.2	8.9	7.2
3 55 PCT T	9.1	52.2	137	31.5	.603	8.0	.067	.367	2000	15.0	10.9	18.2	31.5	25.1	30.8
4 25 PCT T	19.7	23.9	41	21.2	.907	5.0	.066	.552	2000	15.1	1.6	5.8	9.6	8.9	7.2
5 10 PCT T	17.5	8.6	23	15.9	1.859	9.9	.065	1.128	2000	15.3	.7	5.9	1.1	9.9	2.0
6 25 PCT T	19.7	23.9	41	21.2	.904	5.6	.066	.551	2000	15.2	1.5	5.8	5.1	8.9	7.2
7 90 PCT T	2.3	89.3	221	43.6	.517	9.7	.070	.319	2000	19.3	18.6	43.5	47.2	24.7	38.3
8 25 PCT T	19.4	23.9	42	20.9	.891	5.2	.066	.542	2000	15.1	1.6	6.9	9.8	8.7	7.3
9 C.T.	23.8	0.0	0	3.9	R	R	.059	R	2000	16.9	59.9	1.8	.1	3.0	0.0
1 IDLE	16.9	0.0	0	3.8	R	R	.059	R	600	16.9	4.7	.8	.3	9.8	0.0
2 25 PCT T	19.4	23.9	42	21.5	.917	5.6	.066	.558	2000	15.1	2.8	5.1	5.5	8.9	7.2
3 55 PCT T	9.2	51.5	135	31.9	.609	9.1	.066	.371	2000	15.0	10.8	15.2	37.2	29.9	30.9
4 25 PCT T	19.7	23.9	42	21.0	.896	5.7	.065	.545	2000	15.9	1.8	4.2	5.5	8.7	7.2
5 10 PCT T	17.6	8.6	23	15.2	1.768	3.6	.069	1.075	2000	15.5	.5	2.9	1.0	9.7	2.0
6 25 PCT T	19.7	23.9	42	21.3	.909	5.8	.065	.553	2000	15.3	1.8	4.7	5.7	8.9	7.2
7 90 PCT T	2.3	85.2	224	44.9	.527	7.6	.073	.321	2000	13.7	20.0	61.6	39.3	27.9	38.6
8 25 PCT T	19.7	23.9	42	21.0	.896	5.7	.066	.545	2000	15.2	1.5	4.8	5.5	8.7	7.2
9 C.T.	23.9	0.0	0	3.9	R	R	.059	R	2000	16.8	56.2	1.3	.1	3.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------				5.9	45	10.5
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------				6.5	61	10.0
TWO CYCLE COMPOSITE -	HC- FID 0.35(5.9) + 0.65(6.5) =	6.273	G/KW HR	(9.678 GS)		
	CO- NDIR 0.35(55.9) + 0.65(60.9) =	58.995	G/KW HR	(91.383 GS)		
	NOX-CL 0.35(10.5) + 0.65(10.0) =	10.190	G/KW HR	(7.598 GS)		
	HC + NOX =	16.963	G/KW HR	(12.276 GS)		
	SFC =	.492	KG/KW HR	(.793 GS)		

TABLE B-41. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-2 TEST-209 RUN-2 BASELINE CARB. 6606 1975 CHEV 350

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	427	1.5	16.9	1634	.125	12.79	72
2	1200	8.1	1	427	4.1	16.5	499	.159	13.21	155
3	1200	24.4	3	399	4.5	16.6	1122	.170	13.07	80
4	1200	56.9	7	358	5.4	16.4	1909	.239	13.07	420
5	1200	73.2	9	325	5.9	16.1	1576	.275	13.35	500
6	1200	151.9	19	208	8.2	15.8	1692	.469	13.35	1505
7	1200	222.4	28	71	10.1	16.7	1345	.275	12.79	1460
8	1200	244.0	31	63	10.6	15.4	1471	.613	13.64	1572
9	1200	279.3	35	53	12.1	13.7	1787	2.670	13.07	1230
10	1200	301.0	38	5	13.9	12.7	2077	4.930	11.73	846
11	600	0.0	0	429	1.5	16.8	1457	.125	12.93	58
12	1200	0.0	0	549	1.7	16.1	61665	.337	6.02	15
13	2300	330.8	80	18	28.6	12.6	1895	5.440	11.36	1112
14	2300	301.0	72	63	22.8	14.3	1210	1.396	13.93	2085
15	2300	265.7	64	89	20.3	15.3	386	.275	14.23	2270
16	2300	244.0	59	122	19.2	15.1	307	.312	14.39	2159
17	2300	162.7	39	251	15.0	14.8	569	.583	14.39	1549
18	2300	81.3	20	373	10.6	15.2	159	.389	14.23	690
19	2300	59.7	14	396	9.8	15.1	148	.337	14.39	550
20	2300	24.4	6	447	8.0	15.3	249	.771	13.64	280
21	2300	8.1	2	470	7.2	15.2	216	.738	13.78	188
22	600	0.0	0	429	1.5	17.2	1899	.125	12.52	50
23	2300	0.0	0	549	1.7	16.5	57699	.376	6.17	13

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	18.1	28	2.7	.070	0	3.2	R	R	R
2	13.8	99	15.8	.060	6	9.1	13.53	96.9	15.5
3	38.1	117	9.0	.060	18	10.0	12.93	38.0	2.9
4	76.3	193	55.8	.050	42	11.9	10.67	27.0	7.8
5	67.9	238	71.0	.030	54	13.0	7.33	25.9	7.7
6	98.7	553	291.6	.060	112	18.0	5.17	29.0	15.3
7	102.6	424	369.8	0.000	164	22.2	3.67	15.2	13.2
8	108.5	913	384.7	.040	180	23.9	3.54	29.8	12.5
9	136.0	4103	310.7	0.000	206	26.7	3.87	116.9	8.9
10	170.9	8195	231.1	0.000	222	30.6	4.52	216.7	6.1
11	16.0	28	2.1	.070	0	3.2	R	R	R
12	826.4	91	.7	.120	0	3.7	R	R	R
13	318.7	18483	621.0	.025	244	63.0	4.00	232.0	7.8
14	178.8	4164	1022.5	.055	222	50.3	2.47	57.4	14.1
15	53.9	777	1053.0	.035	196	44.8	.84	12.1	16.5
16	40.0	823	935.7	.060	180	42.4	.68	14.0	15.9
17	56.9	1177	513.7	.060	120	33.1	1.45	30.0	13.1
18	11.5	567	165.4	0.000	60	23.3	.59	28.9	8.4
19	9.8	450	120.8	.065	44	21.5	.68	31.4	8.4
20	13.9	866	51.7	0.000	18	17.7	2.36	147.4	8.8
21	10.7	740	31.0	0.000	6	15.9	5.96	377.5	15.8
22	22.8	30	2.0	.080	0	3.4	R	R	R
23	786.3	103	.6	.060	0	3.7	R	R	R

CYCLE COMPOSITE	HC	10.716	GRAM/ KW HR	(7.991 BS)
	CO	54.177	GRAM/ KW HR	(40.400 BS)
	NOX	13.310	GRAM/ KW HR	(9.925 BS)
	SFC	.431	KG/ KW HR	(.708 BS)
CORRECTED	NOX	12.341	GRAM/ KW HR	(9.203 BS)

TABLE B-42. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-211 RUN-HOT 05-17-76 BASELINE CARB 6604 K= .919 HUM= 7.6 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
2	2000	1890	5.570	11.48	846	17.263	25901	313	16556	913	313.9	16556	379.9	71.1	15
3	2000	1900	5.570	11.36	944	17.150	24902	319	14338	955	319.1	14338	918.3	71.3	15

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
2		.6	95.9	250	56.0	3.32	175.30	9.38	.587	12.9	.081	9.95	235.08	5.87	.357
3		.6	95.6	251	54.9	3.38	172.99	9.82	.575	12.9	.080	9.53	231.99	6.96	.349

ID = B

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-212 RUN-HOT 05-29-76 BASELINE REPEAT K= 1.067 HUM= 19.3 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	1960	5.310	11.48	798	17.014	25220	336	15897	393	335.6	15897	918.9	70.3	13
2	2000	1880	5.690	11.12	729	16.977	24993	320	16772	354	319.7	16772	377.5	70.5	15

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1		.5	99.3	248	55.6	3.44	172.50	9.26	.589	12.4	.080	9.88	231.33	5.71	.359
2		.4	99.6	248	55.1	3.42	182.80	9.96	.593	12.5	.080	9.65	299.86	5.15	.359

ID =

TABLE B-43. ILLUSTRATIVE EXAMPLE FOR USING RELATIONSHIPS GIVEN IN TABLE 8 IN REPORT SECTION III. B. 2.

Mode	Measured Emissions			Factors from Table 8			Approximate Contribution to Composite g/kW-hr = Emissions x Factor		
	HC, ppm	CO, %	NO_x, ppm	HC	CO	NO_x	HC	CO	NO_x[a]
Idle	2400	0.1	100	0.0002	3	0.0005	0.48	0.3	0.1
25%	400	0.3	700	0.0013	26	0.0043	0.52	7.8	3.0
55%	900	0.4	1700	0.0009	18	0.0030	0.81	7.2	5.1
10%	200	0.4	200	0.0001	3	0.0004	0.02	1.2	0.1
90%	700	0.4	2500	0.0008	16	0.0027	0.56	6.4	6.8
CT	25000	0.3	50	0.0001	2	0.0003	2.50	0.6	0.0
Estimated Composite 9-EPA Emissions in g/kW-hr =							4.89	23.5	15.1

[a] NO_x values can be corrected for humidity by multiplying the values shown by the appropriate humidity correction factor

APPENDIX C

STANDARD CARBURETOR EVALUATIONS

C-1 Summary of the Results
C-2 BPEGR Rate Vs Manifold Vacuum - Test 120
C-3 BPEGR Rate Vs Manifold Vacuum - Test 121
C-4 through C-31 Computer Printouts - Engine 1
C-32 through C-38 Computer Printouts - Engine 2

TABLE C-1 STANDARD CARBURETOR EVALUATIONS - ENGINES 1 (Tests 1XX) AND 2 (Tests 2XX)

Test No.	Run No.	Type Test	Description	Gram/kW Hr HC	CO	NO_x	HC+NO_x	Kg/kW Hr SFC	Appendix Table
110	2	9-EPA	TR with Air Inj. on All Modes	10.418	5.361	12.766	23.183	.482	C-4
	3			9.951	6.457	11.603	21.554	.478	C-5
			Average	10.185	5.909	12.185	22.369	.480	
111	1	9-EPA	TR with Air Except at CT	2.103	6.637	11.833	13.937	.479	C-6
	2		TR and Decel - Air Off at CT	0.164	4.929	11.493	11.656	.506	C-7
115	1	9-EPA	Mod. BL-Carb. 6607 - Ported In-Ex Man HEIWOVA	6.122	93.323	9.255	15.377	.495	C-8
116	1	9-EPA	BPEGR 6.4mm orifice - Spring 1 - Mod. Conf. 115	7.347	93.111	7.808	15.156	.487	C-9
117	1	9-EPA	BPEGR 6.4mm orifice - Spring 2 - Mod. Conf. 115	7.755	104.824	7.983	15.738	.484	C-10
11X		WOT	WOT for Tests 115-117	4.74	259.99	7.60		.369	C-11
118	1	9-EPA	BPEGR 6.4mm orifice - Spring 3 - Mod. Conf. 115	6.793	80.911	8.341	15.134	.483	C-12
119	1-4	S.S.	Modal Evaluations Using Conf. 115 and Manual EGR						C-13 - C-16
122	1	9-EPA	BPEGR 13.5mm orifice - Spring 2- Mod. Conf. 115	5.764	115.369	4.819	10.583	.505	C-17
123	1	9-EPA	BPEGR-HEIWAI - 14BTDC - .53/x 7 coil	12.395	42.903	4.585	16.980	.531	C-18
124	1	9-EPA	Carb-PL-HEI WAIALLMODES -14BTDC Eng. Ck.	10.015	23.569	8.572	18.587	.503	C-19
130	1	S.S.	Carb-PL-HEI 4BTDC Idle						C-20
	2		Carb-PL-HEI 14BTDC M1+2-30B M3+4 10 Pct						C-21
	3		Carb-PL-HEI-MEGR.53 30BTDC-WAI 25 Pct						C-22
	4		Carb-PL-HEI-MEGR.53 24BTDC-WAI 55 Pct						C-23
	5		Carb-PL-HEI-MEGR.53 14BTDC-WAI 90 Pct						C-24
	6		Carb-PL-HEI 14BTDC-NOAI M1+2 CT						C-25
130	1X	9-EPA	Carb-PL-HEI MEGR.53-WAIXM1,5,9-14,24,30B	4.542	18.911	5.842	10.384	.444	C-26
	2X		Same as Run 1 Except with 1400NLRPM at CT	1.288	18.424	5.945	7.232	.468	C-27
131	1	9-EPA	Post Overhaul Baseline - Carburetor 6607	4.852	44.920	10.744	15.596	.457	C-28
	2		Post Overhaul Baseline - Carburetor 6607	4.587	48.006	9.777	14.364	.457	C-29
	3		Post Overhaul Baseline - Carburetor 6607	5.743	50.321	10.509	16.252	.458	C-30
	WOT		Post Overhaul Baseline - Carburetor 6607						C-31
213	1	9-EPA	Carb. 6606, Port Liners W/O Air	5.173	29.058	12.305	17.478	.464	C-32
	2		Carb. 6606, Port Liners W/O Air	5.163	30.643	12.009	17.172	.465	C-33
	3		Carb. 6606, Port Liners With Air	11.681	16.102	10.689	22.370	.464	C-34
	4		Carb. 6606, Port Liners With Air X-CT	2.777	15.595	11.328	14.105	.460	C-35
	1 & 2	WOT	Carb. 6606, Port Liners W/O Air	4.94	252.68	5.44	10.38	.369	C-36
	3 & 4	WOT	Carb. 6606, Port Liners With Air	0.79	118.83	4.27	5.06	.362	C-36
219	2	9-EPA	Mod BL-Ported In-Ex Man Carb 6606, HEIWOVA	6.043	51.196	10.381	16.424	.444	C-37
	3		Same Conf. as Run 2 except WVA	7.811	43.368	14.944	22.755	.390	C-38

BPEGR Spring 1 = 5 coils - .094 - 1.38
BPEGR Spring 2 = 7 coils - .063 - 2.44
BPEGR Spring 3 = 5 coils - .125 - 1.56

TABLE C-2. BPEGR RATE VS. MANIFOLD VACUUM

Test 120 - 10.3mm Orifice
With Vacuum Advance Except Spring Labeled 2*

Man. Vac, Hg		Exhaust CO_2 With Spring No.				Intake CO_2 With Spring No.				Approx. % EGR With Spring No.			
mm	inches	1	2	2*	3	1	2	2*	3	1	2	2*	3
457	18	13.35	13.49	-	13.07	0.08	0.08	-	0.08	0	0	-	0
432	17	13.35	13.78	-	13.49	0.08	0.15	-	0.08	0	0.6	-	0
406	16	13.78	13.78	13.93	13.49	0.27	0.23	0.27	0.08	1.5	1.2	1.5	0
381	15	13.78	13.78	13.93	13.64	0.35	0.27	0.27	0.08	2.2	1.5	1.5	0
356	14	13.64	13.78	13.93	13.64	0.47	0.39	0.27	0.08	3.2	2.5	1.5	0
330	13	13.64	13.78	13.93	13.64	0.51	0.55	0.27	0.08	3.5	3.8	1.5	0
305	12	13.64	13.78	14.08	13.64	0.59	0.59	0.67	0.15	4.2	4.2	4.7	0.6
279	11	13.64	13.78	14.08	13.64	0.59	0.63	0.67	0.15	4.2	4.5	4.7	0.6
254	10	13.93	13.78	14.08	13.93	0.63	0.63	0.67	0.15	4.5	4.5	4.7	0.6
229	9	13.93	13.93	14.08	13.93	0.63	0.67	0.67	0.19	4.5	4.8	4.7	0.9
203	8	13.93	13.93	14.08	13.93	0.63	0.67	0.67	0.19	4.5	4.8	4.7	0.9
178	7	13.93	14.08	14.08	13.93	0.67	0.67	0.67	0.19	4.8	4.7	4.7	0.9
152	6	13.93	14.08	14.23	13.93	0.67	0.67	0.75	0.23	4.8	4.7	5.4	1.1
127	5	13.93	14.08	14.23	13.93	0.67	0.67	0.75	0.15	4.8	4.7	5.4	0.6
102	4	14.08	14.08	14.23	14.08	0.63	0.67	0.75	0.08	4.4	4.7	5.4	0
76	3	14.08	14.08	14.23	11.48	0.59	0.55	0.63	0.08	4.1	3.9	4.4	0
51	2	11.12	11.24	14.23	11.36	0.15	0.08	0.31	0.08	0.7	0	1.8	0
25	1	11.24	11.24	11.24	11.36	0.08	0.08	0.08	0.08	0	0	0	0

Approximate Manifold Vacuum at Percent of Maximum Power, mm

Spring No.	10%	25%	55%	90%
1, 2 & 3	460	400	190	50
2*	410	310	140	50

Spring 1 - 5 coil - 3/32 wire - 1-3/8 ext. ht.
Spring 2 - 7 coil - 1/16 wire - 2-7/16 ext. ht.
Spring 3 - 5 coil - 1/8 wire - 1-9/16 ext. ht.

*Without Vacuum Advance

TABLE C-3. BPEGR RATE VS. MANIFOLD VACUUM

Test 121 - 13.5mm Orifice
With Vacuum Advance Except Spring Labeled 2*

Man. Vac, Hg.		Exhaust CO_2 With Spring No.			Intake CO_2 With Spring No.			Approx. % EGR With Spring No.		
mm	inches	1	2	2*	1	2	2*	1	2	2*
457	18	13.21	13.21	-	0.08	0.08	-	0	0	-
432	17	13.21	13.35	-	0.08	0.15	-	0	0.7	-
406	16	13.35	13.64	13.64	0.08	0.35	0.08	0	2.2	0
381	15	13.64	13.64	13.64	0.31	0.67	0.08	1.9	4.9	0
356	14	13.64	13.64	13.64	0.39	0.71	0.08	2.5	5.2	0
330	13	13.64	13.78	13.78	0.55	0.71	0.15	3.9	5.2	0.6
305	12	13.64	13.93	13.78	0.63	0.79	0.75	4.5	5.8	5.5
279	11	13.64	13.93	13.93	0.71	0.79	0.75	5.2	5.8	5.5
254	10	13.64	13.93	13.93	0.71	0.84	0.75	5.2	6.2	5.5
229	9	13.64	13.93	13.93	0.71	0.84	0.75	5.2	6.2	5.5
203	8	13.64	13.78	13.93	0.71	0.84	0.75	5.2	6.3	5.5
178	7	13.78	13.93	13.93	0.63	0.84	0.79	4.5	6.2	5.8
152	6	13.93	13.93	13.93	0.67	0.88	0.92	4.8	6.6	6.9
127	5	13.93	13.93	13.93	0.71	0.84	0.92	5.1	6.2	6.9
102	4	13.93	13.93	13.64	0.79	0.79	0.92	5.8	5.8	7.1
76	3	13.93	13.07	11.86	0.75	0.63	0.88	5.5	4.8	7.6
51	2	11.61	11.61	11.48	0.15	0.08	0.15	1.1	0	0.6
25	1	11.24	11.36	11.48	0.08	0.08	0.08	0	0	0

Approximate Manifold Vacuum at Percent of Maximum Power, mm

Spring No.	10%	25%	55%	90%
1 & 2	460	400	190	55
2*	420	310	130	55

Spring 1 - 5 coil - 3/32 wire - 1 3/8 ext. ht.
Spring 2 - 7 coil - 1/16 wire - 2 7/16 ext. ht.

*Without Vacuum Advance

TABLE C-4. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-110 RUN-02 06-03-76 THERMAL REACTOR WITH AIR INJ. ON ALL MODES K= 1.089 HUM= 16.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HP	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	580	.115	8.91	49	9.087	1996	19	51	9	.232	3.2	12	.9	0.0	950
2 25 PCT T	25	.072	11.00	960	11.075	10297	3	135	155	.077	.2	10	11.9	17.0	358
3 55 PCT T	5	.051	12.38	1195	12.431	14792	1	122	512	.197	.1	18	75.3	37.9	226
4 25 PCT T	5	.096	11.00	990	11.096	10160	1	85	163	.077	.0	7	12.5	17.0	356
5 10 PCT T	90	.109	10.91	205	10.523	7867	3	169	55	.057	.2	9	3.1	6.8	932
6 25 PCT T	10	.096	10.88	990	10.927	10160	1	86	165	.077	.1	7	12.7	17.0	358
7 90 PCT T	5	.035	13.99	1498	13.526	19822	1	105	873	.113	.1	12	98.6	61.2	61
8 25 PCT T	5	.030	11.00	970	11.031	10070	1	56	155	.077	.0	9	11.9	17.0	358
9 C.T.	37120	.216	1.97	12	5.973	1959	1237	193	1	.193	176.8	20	.2	0.0	610
1 IDLE	900	.120	8.81	51	9.027	1950	21	52	9	.232	4.9	12	.9	0.0	955
2 25 PCT T	175	.047	10.76	970	10.896	10160	18	126	159	.077	1.9	10	12.3	17.0	358
3 55 PCT T	105	.051	12.12	1207	12.183	14651	19	124	525	.197	2.1	18	77.1	37.9	226
4 25 PCT T	70	.096	10.89	985	10.933	10115	7	85	162	.077	.5	7	12.5	17.0	356
5 10 PCT T	95	.051	10.07	200	10.131	7867	8	80	56	.057	.5	5	3.2	6.8	939
6 25 PCT T	50	.096	10.88	995	10.931	10115	5	85	166	.077	.4	7	12.7	17.0	358
7 90 PCT T	30	.035	13.69	1626	13.679	19696	5	103	896	.113	.5	12	95.6	61.2	66
8 25 PCT T	25	.030	10.88	995	10.913	10070	3	56	165	.077	.2	9	12.7	17.0	358
9 C.T.	38900	.216	2.17	13	6.311	1996	1291	138	1	.193	177.5	20	.2	0.0	615

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.7	0.0	0	9.9	R	R	.042	R	600	23.9	1.8	11.9	.9	5.3	0.0
2 25 PCT T	19.1	22.5	40	22.7	.996	6.9	.050	.606	2000	19.8	.1	10.5	5.2	9.1	7.3
3 55 PCT T	8.9	50.2	132	32.5	.648	10.3	.056	.398	2000	17.8	.1	18.1	33.1	29.8	30.5
4 25 PCT T	19.0	22.8	40	22.9	.982	7.2	.050	.597	2000	19.9	.0	6.6	5.5	9.0	7.3
5 10 PCT T	17.0	9.1	24	17.3	1.896	6.1	.098	1.159	2000	20.8	.1	9.9	1.9	5.1	2.1
6 25 PCT T	19.1	22.8	40	22.9	.982	7.3	.050	.597	2000	20.1	.0	6.7	5.6	9.0	7.3
7 90 PCT T	2.9	82.1	214	93.7	.532	10.8	.061	.329	2000	16.9	.1	11.9	93.9	25.7	38.3
8 25 PCT T	19.1	22.8	40	22.2	.973	6.9	.050	.592	2000	19.9	.0	9.3	5.3	8.9	7.3
9 C.T.	29.0	0.0	0	9.3	R	R	.029	R	2000	39.0	97.8	20.6	.1	3.2	0.0
1 IDLE	17.9	0.0	0	9.3	R	R	.042	R	600	29.1	2.6	13.0	.9	5.2	0.0
2 25 PCT T	19.1	22.8	40	22.9	.982	7.1	.049	.593	2000	20.2	.7	10.9	5.4	9.0	7.3
3 55 PCT T	8.9	50.2	132	32.3	.644	10.4	.055	.392	2000	18.1	1.1	19.5	33.9	29.8	30.5
4 25 PCT T	19.0	22.8	40	22.3	.978	7.2	.050	.595	2000	20.1	.3	7.0	5.5	9.0	7.3
5 10 PCT T	17.1	9.1	24	17.3	1.896	6.2	.096	1.159	2000	21.6	.2	9.9	1.9	5.2	2.1
6 25 PCT T	19.1	22.8	40	22.3	.978	7.9	.050	.595	2000	20.1	.2	7.0	5.6	9.0	7.3
7 90 PCT T	2.6	82.1	214	93.9	.529	10.9	.062	.329	2000	16.2	.9	12.9	92.1	25.6	38.3
8 25 PCT T	19.1	22.8	40	22.2	.973	7.3	.050	.592	2000	20.1	.1	9.7	5.6	8.9	7.2
9 C.T.	29.2	0.0	0	9.4	R	R	.031	R	2000	32.2	99.9	21.1	.1	3.3	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 10.2 6 12.8

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 10.6 5 12.8

TWO CYCLE COMPOSITE -

HC- FID	0.35(10.2) + 0.65(10.6) =	10.918	G/KW HR	(7.768 BS)
CO- NDIR	0.35(5.4) + 0.65(5.2) =	5.361	G/KW HR	(3.998 BS)
NOX-CL	0.35(12.8) + 0.65(12.8) =	12.766	G/KW HR	(9.519 BS)
	HC + NOX =	23.183	G/KW HR	(17.288 BS)
	SFC =	.982	KG/KW HR	(.792 BS)

TABLE C-5. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-110 RUN-03 06-03-76 THERMAL REACTOR WITH AIR INJ. ON ALL MODES K= 1.103 HUM= 17.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HP	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	800	.125	8.81	95	9.022	1996	19	56	9	.232	9.9	13	.8	0.0	997
2 25 PCT T	20	.131	11.00	990	11.133	10160	2	291	169	.077	.2	19	12.6	17.1	358
3 55 PCT T	5	.061	12.38	1218	12.442	19451	1	196	525	.197	.1	21	77.2	37.7	226
4 25 PCT T	5	.056	11.00	995	11.057	10115	1	103	166	.077	.0	8	12.8	17.1	356
5 10 PCT T	20	.072	10.30	205	10.379	7897	2	110	57	.057	.1	6	3.2	6.9	927
6 25 PCT T	5	.061	11.00	500	11.062	10115	1	113	167	.077	.0	9	12.9	17.1	358
7 90 PCT T	5	.051	19.08	1265	19.131	19958	1	195	659	.113	.1	16	73.9	61.7	66
8 25 PCT T	5	.096	11.12	520	11.164	10029	0	93	171	.077	.0	6	13.2	17.1	356
9 C.T.	37120	.216	1.88	19	5.890	1905	1226	191	2	.193	175.3	20	.2	0.0	610
1 IDLE	890	.131	8.91	51	9.132	1905	19	55	9	.232	9.9	13	.9	0.0	997
2 25 PCT T	155	.088	11.00	500	11.105	10206	16	143	168	.077	1.2	19	13.0	17.1	358
3 55 PCT T	90	.067	12.25	1253	12.329	19515	12	158	540	.197	1.7	23	79.9	37.6	226
4 25 PCT T	45	.056	11.00	515	11.063	10070	7	103	172	.077	.5	8	13.2	17.1	351
5 10 PCT T	60	.072	10.91	210	10.988	7802	5	108	57	.057	.3	6	3.3	6.8	927
6 25 PCT T	45	.056	11.00	515	11.061	10115	5	103	173	.077	.3	8	13.3	17.1	358
7 90 PCT T	30	.096	19.23	1207	19.279	19958	5	129	618	.113	.5	15	69.8	61.5	66
8 25 PCT T	30	.096	11.12	525	11.169	9979	3	82	172	.077	.2	6	13.2	17.1	356
9 C.T.	35200	.227	2.07	13	5.892	1905	1162	199	2	.193	166.2	21	.2	0.0	610

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	PERCENT OF TOTAL HC	CO	NOX	FUEL	POWER
1 IDLE	17.6	0.0	0	9.9	0	0	.092	0	600	29.1	2.5	10.9	.9	5.3	0.0
2 25 PCT T	19.1	22.9	60	22.9	.976	7.3	.051	.599	2000	19.7	.1	15.6	6.1	9.0	7.2
3 55 PCT T	8.9	50.5	133	32.3	.639	10.6	.056	.389	2000	17.8	.1	18.0	37.3	29.7	30.5
4 25 PCT T	19.0	23.0	60	22.3	.970	7.9	.050	.590	2000	19.9	.0	6.7	6.2	8.9	7.3
5 10 PCT T	16.8	9.2	24	17.3	1.881	6.3	.097	1.199	2000	21.1	.1	5.3	1.6	5.1	2.2
6 25 PCT T	19.1	23.0	60	22.3	.970	7.9	.050	.590	2000	19.9	.0	7.3	6.2	8.9	7.3
7 90 PCT T	2.6	82.7	217	99.0	.532	8.1	.063	.329	2000	15.8	.1	13.8	35.7	25.9	38.3
8 25 PCT T	19.0	23.0	60	22.1	.961	7.6	.051	.585	2000	19.7	.0	5.9	6.9	8.9	7.3
9 C.T.	29.0	0.0	0	9.2	0	0	.029	0	2000	39.5	97.2	17.0	.1	3.1	0.0
1 IDLE	17.6	0.0	0	9.2	0	0	.092	0	600	23.8	2.5	11.3	.9	5.1	0.0
2 25 PCT T	19.1	23.0	60	22.5	.979	7.5	.051	.595	2000	19.8	.7	11.1	6.3	9.1	7.3
3 55 PCT T	8.9	50.5	133	32.0	.634	10.9	.056	.386	2000	17.9	1.0	20.6	38.5	29.6	30.5
4 25 PCT T	13.8	22.9	60	22.2	.968	7.6	.050	.589	2000	19.9	.3	7.0	6.9	9.0	7.3
5 10 PCT T	16.8	9.2	24	17.2	1.877	6.9	.098	1.192	2000	20.9	.2	5.5	1.6	5.1	2.1
6 25 PCT T	19.1	22.9	60	22.3	.973	7.7	.050	.592	2000	19.9	.2	7.1	6.9	9.0	7.3
7 90 PCT T	2.6	82.5	217	99.0	.539	7.4	.069	.325	2000	15.6	.3	12.9	33.8	26.1	38.3
8 25 PCT T	19.0	22.9	60	22.0	.960	7.6	.051	.584	2000	19.7	.1	5.6	6.9	8.9	7.3
9 C.T.	29.0	0.0	0	9.2	0	0	.029	0	2000	39.5	99.7	18.8	.1	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 10.1 7 11.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 9.9 6 11.6

TWO CYCLE COMPOSITE -

HC- FID 0.35(10.1) + 0.65(9.9) = 9.951 G/KW HR (7.421 BS)

CO- NDIR 0.35(6.2) + 0.65(6.3) = 6.257 G/KW HR (9.815 BS)

NOX-CL 0.35(11.6) + 0.65(11.6) = 11.603 G/KW HR (8.652 BS)

HC + NOX = 21.554 G/KW HR (16.073 BS)

SFC = .478 KG/KW HR (.785 BS)

TABLE C-6. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
ENGINE-01 TEST-111 RUN-01 04-03-76 THERMAL REACTOR WITH AIR EXCEPT AT CT Ke= 1.105 HUM= 17.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	930	.136	9.01	52	9.193	1860	9	56	9	.232	2.2	13	.9	0.0	492
2 25 PCT T	30	.093	11.00	530	11.096	10251	3	179	180	.077	.2	13	13.8	17.2	358
3 55 PCT T	5	.072	12.52	1253	12.592	19451	1	169	535	.197	.1	25	78.6	37.8	221
4 25 PCT T	5	.041	11.29	540	11.302	10115	0	111	177	.077	.0	9	13.7	17.2	351
5 10 PCT T	5	.072	10.53	230	10.602	7902	0	107	62	.057	.0	6	3.5	6.9	427
6 25 PCT T	5	.041	11.29	550	11.302	10115	0	111	181	.077	.0	9	13.9	17.2	358
7 90 PCT T	6	.072	19.56	1136	19.612	20638	1	205	589	.113	.1	23	66.5	62.3	61
8 25 PCT T	5	.096	11.29	540	11.296	10029	0	82	182	.077	.0	6	14.1	17.2	351
9 C.T.	12800	.915	11.00	26	12.830	1860	205	122	1	.193	39.3	17	.2	0.0	605
1 IDLE	660	.130	9.01	51	9.252	1905	15	71	9	.232	3.9	16	.9	0.0	492
2 25 PCT T	90	.093	11.24	500	11.393	10115	9	168	169	.077	.7	13	12.6	17.2	358
3 55 PCT T	40	.061	12.52	1288	12.586	19560	5	193	597	.197	.8	21	80.9	37.8	229
4 25 PCT T	20	.056	11.29	500	11.348	10029	2	101	163	.077	.2	8	12.5	17.2	353
5 10 PCT T	30	.077	10.53	220	10.610	7897	2	115	60	.057	.1	7	3.9	6.9	427
6 25 PCT T	10	.061	11.12	590	11.182	10070	1	112	178	.077	.1	9	13.7	17.2	358
7 90 PCT T	5	.051	19.39	1277	19.441	20729	1	198	673	.113	.1	17	76.0	61.8	61
8 25 PCT T	5	.096	11.24	540	11.286	10029	0	82	182	.077	.0	6	14.1	17.2	353
9 C.T.	19720	.969	10.53	26	12.421	1905	295	193	1	.193	35.0	20	.2	0.0	607

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CID	FC	BSFC	BSNOx	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 IDLE	17.9	0.0	0	9.1	0	0	.092	0	600	23.7	6.8	10.7	.9	9.9	0.0
2 25 PCT T	19.1	23.0	40	22.6	.981	8.0	.051	.597	2000	19.8	.7	11.0	6.7	9.0	7.2
3 55 PCT T	8.7	50.7	133	32.3	.637	10.8	.057	.387	2000	17.6	.3	20.5	38.3	29.4	30.9
4 25 PCT T	13.8	23.1	41	22.3	.966	7.9	.051	.587	2000	19.5	.1	7.0	6.7	8.9	7.2
5 10 PCT T	14.8	9.2	24	17.2	1.862	6.9	.098	1.133	2000	20.7	.1	5.0	1.7	5.1	2.1
6 25 PCT T	19.1	23.1	41	22.3	.946	8.0	.051	.587	2000	19.5	.1	7.0	6.8	8.9	7.2
7 90 PCT T	2.9	83.6	218	45.5	.595	7.2	.044	.331	2010	15.3	.3	19.1	32.9	26.7	38.5
8 25 PCT T	13.8	23.1	41	22.1	.957	8.1	.051	.582	2000	19.5	.1	5.2	6.8	8.8	7.2
9 C.T.	23.8	0.0	0	9.1	0	0	.059	0	2000	16.9	91.9	19.3	.1	3.0	0.0
1 IDLE	17.9	0.0	0	9.2	0	0	.093	0	600	23.5	8.5	19.1	.9	9.1	0.0
2 25 PCT T	19.1	23.1	41	22.3	.964	7.3	.052	.592	2000	19.9	1.7	11.1	5.9	8.9	7.3
3 55 PCT T	8.8	50.7	133	32.1	.633	11.0	.057	.385	2000	17.6	1.9	19.0	37.6	29.5	30.5
4 25 PCT T	13.9	23.1	41	22.1	.959	7.2	.051	.583	2000	19.5	.9	4.6	5.9	8.8	7.3
5 10 PCT T	14.9	9.2	24	17.3	1.876	6.4	.098	1.141	2000	20.7	.3	5.6	1.6	5.1	2.1
6 25 PCT T	19.1	23.0	40	22.2	.969	7.9	.051	.586	2000	19.7	.2	7.9	6.9	8.9	7.3
7 90 PCT T	2.9	82.9	218	45.7	.551	8.3	.045	.335	2000	15.9	.2	19.3	35.5	26.8	38.3
8 25 PCT T	13.9	23.0	40	22.1	.960	8.1	.051	.584	2000	19.5	.1	5.9	6.6	8.8	7.2
9 C.T.	23.9	0.0	0	9.2	0	0	.059	0	2000	17.1	86.7	17.5	.1	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 1.8 7 11.5
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 2.3 7 12.0

TWO CYCLE COMPOSITE -

HC- FID	0.35(1.8) + 0.65(2.3) =	2.103	G/KW HR	(1.569	BS)
CO- NDIR	0.35(4.8) + 0.65(4.4) =	6.437	G/KW HR	(4.799	BS)
NOx-CL	0.35(11.5) + 0.65(12.0) =	11.833	G/KW HR	(8.824	BS)
	HC + NOx =	13.937	G/KW HR	(10.393	BS)
	SFC =	.979	KG/KW HR	(.788	BS)

TABLE C-7. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-111 RUN-02 04-03-76 THERMAL REACTOR AND DECEL - AIR OFF MODE 9 K= 1.056 HUM= 13.6 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CMH	VAC. MM
1 IDLE	560	.109	8.81	45	8.979	1960	13	93	3	.232	2.9	18	.8	0.0	999
2 25 PCT T	95	.093	11.00	580	11.098	10206	5	173	179	.077	.9	13	13.9	17.2	358
3 55 PCT T	10	.072	12.52	1323	12.593	19651	1	169	590	.197	.2	25	79.3	37.8	224
4 25 PCT T	5	.061	11.29	570	11.382	10070	0	110	178	.077	.0	8	13.7	17.2	351
5 10 PCT T	28	.061	10.53	230	10.593	7756	2	91	59	.057	.1	5	3.9	6.9	927
6 25 PCT T	5	.061	11.29	580	11.382	10070	0	110	169	.077	.0	8	13.0	17.2	358
7 90 PCT T	5	.061	19.78	1207	19.762	20865	1	175	598	.113	.1	20	67.6	62.6	61
8 25 PCT T	5	.090	11.29	580	11.281	9929	0	72	180	.077	.0	6	13.9	17.2	351
9 C.T.	80	.030	13.07	105	13.189	5352	9	25	15	.193	.5	9	2.1	0.0	990
1 IDLE	270	.115	11.29	59	11.389	1960	5	98	3	.232	1.1	9	.7	0.0	950
2 25 PCT T	15	.067	11.29	560	11.388	10115	1	120	176	.077	.1	9	13.5	17.2	358
3 55 PCT T	5	.051	12.52	1300	12.571	19515	1	119	524	.197	.1	17	77.9	37.8	224
4 25 PCT T	5	.051	11.29	565	11.291	9929	0	91	199	.077	.0	7	11.1	17.2	353
5 10 PCT T	30	.067	11.29	290	11.310	7897	2	93	58	.057	.1	5	3.3	6.9	927
6 25 PCT T	5	.061	11.29	540	11.382	10070	0	110	175	.077	.0	8	13.5	17.2	353
7 90 PCT T	5	.051	19.78	1218	19.751	20820	1	195	603	.113	.1	14	68.1	61.8	61
8 25 PCT T	5	.090	11.29	580	11.281	9929	0	72	180	.077	.0	6	13.9	17.2	351
9 C.T.	80	.030	13.35	110	13.389	5352	9	29	15	.193	.5	3	2.2	0.0	990

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- Hv	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 IDLE	17.5	0.0	0	9.1	0	0	.081	0	600	29.2	68.2	10.1	.9	9.7	0.0
2 25 PCT T	19.1	23.0	60	22.5	.977	7.7	.051	.599	2000	19.8	8.2	13.9	6.5	8.5	7.2
3 55 PCT T	8.8	58.7	133	32.3	.637	10.9	.057	.387	2000	17.6	9.5	25.0	38.3	23.3	30.3
4 25 PCT T	13.8	23.1	61	22.2	.961	7.9	.051	.585	2000	19.5	.9	8.6	6.4	8.9	7.2
5 10 PCT T	16.8	9.2	24	17.1	1.851	6.6	.098	1.126	2000	20.7	2.1	5.2	1.6	9.8	2.1
6 25 PCT T	19.1	23.1	61	22.2	.961	7.5	.051	.585	2000	19.5	.9	8.6	6.3	8.9	7.2
7 90 PCT T	2.9	89.0	218	56.0	.598	7.3	.066	.339	2020	15.1	2.1	19.9	32.6	25.5	38.6
8 25 PCT T	13.8	23.1	61	22.0	.953	8.0	.051	.579	2000	19.5	.9	5.6	6.7	8.3	7.2
9 C.T.	19.3	0.0	0	11.8	0	0	.059	0	2000	16.9	12.2	3.6	1.0	8.3	0.0
1 IDLE	17.7	0.0	0	9.1	0	0	.052	0	600	19.3	51.7	10.7	.9	9.7	0.0
2 25 PCT T	19.1	23.1	61	22.3	.966	7.8	.051	.583	2000	19.9	5.2	11.3	6.6	8.9	7.3
3 55 PCT T	8.8	58.7	133	32.0	.631	10.6	.057	.384	2000	17.6	9.3	21.3	38.0	23.1	30.5
4 25 PCT T	13.9	23.1	61	22.0	.959	6.9	.051	.580	2000	19.5	1.7	8.6	5.9	8.3	7.3
5 10 PCT T	16.8	9.2	24	17.3	1.876	6.5	.051	1.141	2000	19.9	6.0	4.5	1.6	9.9	2.1
6 25 PCT T	19.9	23.0	60	22.2	.966	7.8	.051	.586	2000	19.5	1.7	10.9	6.6	8.9	7.3
7 90 PCT T	2.9	82.9	218	45.9	.554	7.9	.066	.337	2000	15.1	9.1	20.1	33.9	25.5	38.3
8 25 PCT T	13.8	23.0	60	22.0	.956	8.0	.051	.582	2000	19.5	1.7	6.8	6.8	8.3	7.2
9 C.T.	19.3	0.0	0	11.8	0	0	.060	0	2000	16.6	23.5	9.3	1.1	8.3	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .2 6 11.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .1 5 11.9

TWO CYCLE COMPOSITE -

HC- FID 0.35(.2) + 0.65(.1) = .169 G/KW HR (.122 BS)

CO- NDIR 0.35(5.6) + 0.65(9.6) = 9.929 G/KW HR (3.675 BS)

NOX-CL 0.35(11.6) + 0.65(11.9) = 11.793 G/KW HR (8.570 BS)

HC + NOX = 11.454 G/KW HR (8.692 BS)

SFC = .506 KG/KW HR (.831 BS)

TABLE C-8. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-115 RUN-01 08-09-76 MOD BL-CARB 4607-PORTED IN+EX MAN-MEINOVA K= 1.091 HUMN 16.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	COP	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1280	.112	12.38	55	12.835	1996	22	98	3	.232	5.2	23	.7	0.0	929
2 25 PCT T	312	.181	14.08	580	14.297	10933	24	267	153	.077	2.0	21	11.8	17.9	356
3 55 PCT T	560	.459	13.93	1230	14.453	15291	44	1385	963	.147	6.7	209	68.1	38.1	209
4 25 PCT T	220	.209	13.93	590	14.159	10206	18	247	154	.077	1.4	23	11.9	17.9	356
5 10 PCT T	220	.969	13.93	300	14.929	7983	19	524	60	.057	.8	30	3.9	4.8	932
6 25 PCT T	212	.193	13.93	600	14.197	10251	17	282	158	.077	1.3	22	12.1	17.9	356
7 90 PCT T	1568	9.120	12.12	788	14.920	22639	299	11972	398	.113	28.1	1296	95.0	62.7	63
8 25 PCT T	212	.209	13.93	630	14.158	10206	17	297	165	.077	1.3	23	12.7	17.9	356
9 C.T.	23090	.312	9.93	20	12.259	1996	909	103	1	.193	58.5	15	.2	0.0	615
1 IDLE	1920	.350	12.25	62	12.819	1996	33	110	3	.232	7.7	26	.8	0.0	929
2 25 PCT T	384	.216	13.93	610	14.189	10297	32	314	160	.077	2.4	24	12.3	17.9	356
3 55 PCT T	632	.493	13.93	1300	14.695	15150	74	1395	987	.147	10.9	198	71.6	38.2	204
4 25 PCT T	244	.255	13.93	600	14.214	10160	21	1052	150	.077	1.6	81	11.6	17.9	356
5 10 PCT T	280	.312	13.78	300	14.129	7938	18	359	61	.057	1.0	20	3.5	4.8	932
6 25 PCT T	240	.227	13.93	620	14.187	10251	21	332	162	.077	1.6	26	12.5	17.9	356
7 90 PCT T	1632	9.180	12.12	800	14.988	22589	257	11568	397	.113	29.1	1307	99.9	62.8	61
8 25 PCT T	290	.286	13.93	620	14.173	10206	28	319	162	.077	1.5	24	12.5	17.9	356
9 C.T.	22900	.325	9.93	10	12.197	1996	908	107	1	.193	57.1	15	.1	0.0	615

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	14.7	0.0	0	9.9	0	0	.058	0	600	17.2	9.8	1.9	.9	5.1	0.0
2 25 PCT T	19.0	23.3	41	23.0	.988	4.7	.064	.601	2000	15.6	1.8	1.2	7.1	8.8	7.3
3 55 PCT T	8.2	51.1	139	33.6	.658	9.2	.064	.900	2000	15.1	9.0	12.3	91.1	29.9	30.9
4 25 PCT T	19.0	23.3	41	22.5	.967	4.7	.064	.598	2000	15.7	1.3	1.9	7.1	8.6	7.3
5 10 PCT T	17.0	9.1	29	17.6	1.931	4.7	.065	1.175	2000	15.9	.7	1.8	2.1	5.0	2.1
6 25 PCT T	19.0	23.3	41	22.6	.970	4.8	.064	.590	2000	15.7	1.2	1.3	7.3	8.6	7.3
7 90 PCT T	2.5	89.1	221	99.9	.593	9.8	.076	.361	2000	13.2	25.9	74.3	27.1	27.9	38.5
8 25 PCT T	19.0	23.3	41	22.5	.966	7.2	.064	.587	2000	15.7	1.2	1.9	7.6	8.6	7.3
9 C.T.	29.2	0.0	0	9.9	0	0	.058	0	2000	17.9	59.0	.9	.1	3.1	0.0
1 IDLE	14.7	0.0	0	9.9	0	0	.058	0	600	17.2	6.9	1.5	.5	5.1	0.0
2 25 PCT T	19.0	23.3	41	22.7	.979	7.0	.064	.592	2000	15.7	2.1	1.9	7.3	8.7	7.2
3 55 PCT T	8.1	51.2	139	33.9	.653	9.6	.064	.397	2000	15.1	9.4	11.5	92.2	29.9	30.9
4 25 PCT T	19.0	23.3	41	22.9	.961	6.5	.064	.589	2000	15.1	1.9	9.7	6.8	8.4	7.2
5 10 PCT T	17.0	9.1	29	17.5	1.915	6.8	.064	1.165	2000	15.7	.9	1.2	2.1	5.0	2.1
6 25 PCT T	19.0	23.9	41	22.6	.968	7.1	.064	.584	2000	15.7	1.9	1.5	7.9	8.6	7.3
7 90 PCT T	2.9	89.9	222	99.8	.590	9.8	.074	.359	2000	13.1	25.7	74.0	26.9	28.0	38.5
8 25 PCT T	19.0	23.9	41	22.5	.962	7.0	.064	.585	2000	15.7	1.3	1.9	7.3	8.4	7.3
9 C.T.	29.2	0.0	0	9.9	0	0	.057	0	2000	17.5	58.5	.9	.0	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 6.0 91 9.1

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 4.2 95 9.3

TWO CYCLE COMPOSITE -

HC- FID 0.35(6.0) + 0.65(4.2) = 6.122 G/KW HR (4.565 G/B)

CO- NDIR 0.35(91.0) + 0.65(99.6) = 93.323 G/KW HR (69.591 G/B)

NOX-CL 0.35(9.1) + 0.65(9.3) = 9.255 G/KW HR (6.901 G/B)

HC + NOX = 15.377 G/KW HR (11.466 G/B)

SFC = .495 KG/KW HR (.815 G/B)

TABLE C-9. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-116 RUN-1 08-05-76 BPEGR 0.25-SCOIL3X,099X1.3BH -MOD CONF 11S K= 1.098 HUM= 17.0 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	2816	.239	11.99	43	17.593	1905	98	79	3	.232	11.0	17	.8	0.0	924
2 25 PCT T	320	.287	13.78	525	19.109	10297	24	929	190	.077	2.0	33	10.8	17.9	351
3 55 PCT T	588	.788	13.93	1016	19.783	15150	48	1630	380	.197	9.9	290	55.8	38.3	201
4 25 PCT T	269	.312	14.23	590	19.572	10115	21	937	137	.077	1.6	39	10.5	17.9	351
5 10 PCT T	280	.690	13.78	290	19.502	7893	17	759	58	.057	1.0	93	3.3	6.8	932
6 25 PCT T	232	.306	14.23	550	19.562	10160	18	931	190	.077	1.9	33	10.8	17.5	353
7 90 PCT T	1589	3.910	12.52	780	14.617	21909	241	10916	375	.113	27.2	1177	92.9	42.6	63
8 25 PCT T	229	.306	14.09	595	19.911	10070	18	932	139	.077	1.9	33	10.7	17.5	351
9 C.T.	28800	.350	9.01	17	12.989	1950	989	110	1	.193	69.9	16	.1	0.0	605
1 IDLE	3968	.325	11.86	45	17.624	1905	67	99	9	.232	15.5	23	.8	0.0	924
2 25 PCT T	969	.350	14.08	540	19.982	10297	37	502	195	.077	2.9	39	11.2	17.5	351
3 55 PCT T	669	.809	14.09	1028	19.960	15150	77	1695	380	.197	11.2	292	56.8	38.9	201
4 25 PCT T	312	.325	14.23	535	19.590	10115	25	959	135	.077	1.9	35	10.9	17.5	353
5 10 PCT T	320	.659	14.08	290	19.775	7893	19	711	56	.057	1.1	91	3.2	6.8	932
6 25 PCT T	309	.337	14.23	565	19.602	10160	29	979	191	.077	1.8	36	10.8	17.5	353
7 90 PCT T	1692	9.230	12.38	685	16.798	21909	296	11199	326	.113	27.7	1259	36.8	62.7	63
8 25 PCT T	269	.325	14.23	560	19.589	10070	21	953	138	.077	1.6	35	10.7	17.5	351
9 C.T.	30080	.337	8.91	16	12.307	1950	517	108	1	.193	73.9	15	.1	0.0	605

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 IDLE	16.7	0.0	0	9.2	R	R	.057	R	600	17.5	8.9	1.0	.6	9.9	0.0
2 25 PCT T	13.8	23.9	41	22.7	.970	6.1	.064	.590	2000	15.7	1.6	2.0	2.9	8.8	7.3
3 55 PCT T	7.9	51.9	135	33.9	.650	7.5	.047	.396	2000	15.0	7.9	19.7	38.9	29.7	30.5
4 25 PCT T	13.8	23.9	41	22.3	.953	5.9	.065	.580	2000	15.3	1.3	2.1	2.2	8.7	7.3
5 10 PCT T	17.0	9.2	24	17.9	1.901	6.9	.065	1.156	2000	15.3	.8	2.7	2.3	5.0	2.1
6 25 PCT T	13.9	23.9	41	22.9	.957	6.1	.065	.582	2000	15.3	1.1	2.0	2.9	8.7	7.3
7 90 PCT T	2.5	83.9	220	98.3	.574	9.5	.077	.350	2000	13.0	21.7	22.9	29.2	27.5	38.3
8 25 PCT T	13.8	23.9	41	22.2	.998	6.0	.065	.577	2000	15.9	1.1	2.0	2.9	8.6	7.3
9 C.T.	23.8	0.0	0	9.3	R	R	.059	R	2000	16.9	55.7	1.0	.1	3.1	0.0
1 IDLE	16.7	0.0	0	9.2	R	R	.058	R	600	17.9	11.2	1.3	.6	9.9	0.0
2 25 PCT T	13.8	23.9	42	22.7	.969	6.3	.065	.589	2000	15.3	2.1	2.2	8.0	8.8	7.3
3 55 PCT T	7.9	51.5	135	33.9	.648	7.5	.047	.394	2000	14.8	8.2	19.3	39.9	29.7	30.5
4 25 PCT T	13.9	23.9	42	22.3	.951	5.9	.066	.579	2000	15.2	1.9	2.0	2.9	8.7	7.3
5 10 PCT T	17.0	9.2	24	17.9	1.896	6.9	.067	1.153	2000	15.0	.8	2.3	2.3	5.0	2.1
6 25 PCT T	13.9	23.5	42	22.9	.955	6.1	.066	.581	2000	15.2	1.3	2.1	2.8	8.7	7.3
7 90 PCT T	2.5	89.1	221	98.3	.579	9.9	.078	.349	2000	12.9	20.2	23.0	26.3	27.5	38.3
8 25 PCT T	13.8	23.5	42	22.2	.996	6.0	.066	.574	2000	15.3	1.2	2.0	2.6	8.6	7.3
9 C.T.	23.8	0.0	0	9.3	R	R	.058	R	2000	17.1	53.7	.9	.1	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 6.9 90 8.0

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 7.6 95 7.7

TWO CYCLE COMPOSITE -

HC- FID 0.35(6.9) + 0.65(7.6) = 7.397 G/KW HR (5.479 G/B)

CO- NDIR 0.35(89.5) + 0.65(95.0) = 93.111 G/KW HR (69.033 G/B)

NOX-CL 0.35(8.0) + 0.65(7.3) = 7.808 G/KW HR (5.823 G/B)

HC + NOX = 15.154 G/KW HR (11.301 G/B)

SFC = .493 KG/KW HR (.800 G/B)

TABLE C-10. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311 K= 1.109 HUM= 10.5 G/KG

ENGINE-01 TEST-117 RUN-1 08-05-76 RPEGR 0.25-?COILSX.063X2.99H -MOD CONF 11S

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	3899	.197	11.73	59	12.309	1840	49	95	3	.232	19.9	10	.8	0.0	929
2 25 PCT T	900	.287	19.23	610	19.563	10297	32	910	159	.077	2.5	32	12.2	17.6	356
3 55 PCT T	656	.771	19.23	1112	15.076	19923	24	1592	985	.197	10.9	227	59.6	38.9	206
4 25 PCT T	288	.337	19.23	580	19.600	10029	22	968	197	.077	1.7	36	11.3	17.6	356
5 10 PCT T	288	.659	13.93	310	19.622	7666	17	698	60	.057	1.0	40	3.9	6.9	939
6 25 PCT T	288	.312	19.23	590	19.575	10029	22	933	199	.077	1.7	33	11.5	17.6	356
7 90 PCT T	1600	9.810	11.99	600	16.985	22589	296	12922	299	.113	27.8	1960	33.2	62.9	61
8 25 PCT T	288	.337	19.23	570	19.600	9979	22	965	193	.077	1.7	34	11.0	17.6	356
9 C.T.	26880	.287	8.81	8	12.017	1950	973	99	0	.193	47.7	13	.1	0.0	602
1 IDLE	5990	.251	11.84	68	12.714	1950	93	78	4	.232	21.5	18	.9	0.0	927
2 25 PCT T	980	.363	19.08	600	19.997	10115	38	911	159	.077	2.9	39	11.9	17.6	356
3 55 PCT T	712	.755	19.39	1159	15.224	19969	80	1998	919	.197	11.7	220	61.7	38.9	208
4 25 PCT T	328	.325	19.23	610	19.592	9979	25	998	159	.077	2.0	35	11.8	17.6	356
5 10 PCT T	320	.598	13.93	310	19.566	7620	19	632	60	.057	1.1	36	3.9	6.9	939
6 25 PCT T	296	.287	19.23	600	19.551	9939	23	996	151	.077	1.8	31	11.6	17.6	356
7 90 PCT T	1696	9.810	11.86	600	16.866	22599	262	12987	295	.113	29.6	1968	33.9	62.9	61
8 25 PCT T	288	.325	19.39	530	19.797	9888	22	990	131	.077	1.7	39	10.1	17.7	358
9 C.T.	28800	.325	8.92	8	11.857	1950	512	108	0	.193	73.2	15	.1	0.0	602

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	16.7	0.0	0	9.1	R	R	.056	R	600	17.8	11.5	.6	.5	9.8	0.0
2 25 PCT T	19.0	23.7	62	22.7	.959	6.9	.065	.583	2000	15.3	1.9	1.7	8.5	8.8	7.3
3 55 PCT T	8.1	51.9	135	32.9	.490	8.1	.068	.389	2000	19.7	8.4	12.0	91.6	29.9	30.9
4 25 PCT T	19.0	23.6	62	22.1	.935	6.9	.066	.569	2000	15.2	1.3	1.9	7.9	8.4	7.3
5 10 PCT T	17.1	9.3	29	16.9	1.827	6.6	.066	1.111	2000	15.2	.8	2.1	2.9	9.9	2.1
6 25 PCT T	19.0	23.6	62	22.1	.935	6.5	.066	.564	2000	15.3	1.3	1.8	8.0	8.4	7.3
7 90 PCT T	2.9	89.3	221	99.8	.591	3.6	.079	.359	2000	12.7	21.9	77.9	23.2	28.9	38.3
8 25 PCT T	19.0	23.7	62	22.0	.930	6.2	.066	.565	2000	15.2	1.3	1.9	7.7	8.5	7.3
9 C.T.	23.7	0.0	0	9.3	R	R	.057	R	2000	17.6	52.1	.7	.0	3.1	0.0
1 IDLE	16.8	0.0	0	9.3	R	R	.058	R	600	17.2	19.8	1.0	.6	9.0	0.0
2 25 PCT T	19.0	23.7	62	22.3	.992	6.7	.065	.573	2000	15.3	2.0	2.1	8.2	8.7	7.3
3 55 PCT T	8.2	51.9	135	33.0	.691	8.4	.069	.390	2000	19.6	8.1	11.6	92.6	29.5	30.9
4 25 PCT T	19.0	23.7	62	22.0	.930	6.7	.066	.565	2000	15.2	1.3	1.8	8.2	8.5	7.3
5 10 PCT T	17.1	9.3	29	16.8	1.819	6.6	.066	1.109	2000	15.2	.7	1.9	2.9	9.8	2.1
6 25 PCT T	19.0	23.7	62	21.9	.925	6.4	.065	.563	2000	15.3	1.2	1.6	8.0	8.5	7.3
7 90 PCT T	2.9	89.9	222	99.7	.588	3.6	.079	.358	2000	12.7	20.3	77.9	23.0	28.3	38.3
8 25 PCT T	19.1	23.7	62	21.8	.920	5.7	.064	.560	2000	15.1	1.2	1.8	7.0	8.5	7.3
9 C.T.	23.7	0.0	0	9.3	R	R	.056	R	2000	17.8	50.3	.8	.0	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 7.2 105 7.9

SUM---(COMPOSITE VALUF FOR CYCLE 2)---------- 8.1 105 8.0

TWO CYCLE COMPOSITE -

HC- FID	0.35(	7.2) + 0.65(	8.1) =	7.755	G/KW HR	(5.783 G/)
CO- NDIR	0.35(	105.5) + 0.65(	105.0) =	104.829	G/KW HR	(78.167 G/)
NOX-CL	0.35(	7.9) + 0.65(	8.0) =	7.983	G/KW HR	(5.953 G/)
			HC + NOX =	15.738	G/KW HR	(11.736 G/)
			SFC =	.489	KG/KW HR	(.796 G/)

TABLE C-11. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-11X RUN-NOT 08-09-76 MOD BL-CARB 6607-PORTED IN-EX MAN-HEINOVA K= 1.091 HUM= 16.3 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	1888	5.890	11.12	1016	17.178	29993	318	17163	991	317.8	17163	535.5	67.3	18
2	2000	1856	6.050	11.29	1028	17.505	29902	306	17385	986	306.3	17385	529.8	67.0	18
3	2000	1888	5.890	11.36	1112	17.919	29675	310	16711	523	310.0	16711	570.7	67.3	18

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	115	.?	90.3	237	55.1	3.59	193.97	5.55	.610	12.4	.081	9.82	260.07	7.99	.371
2	116	.?	89.9	236	54.9	3.98	197.56	5.52	.611	12.1	.082	9.67	269.93	7.90	.371
3	117	.?	90.3	237	54.9	3.52	189.90	5.99	.602	12.2	.082	9.72	259.66	7.97	.366

ID = TEST NO.

TABLE C-12. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-118 RUN-1 08-06-76 APEGR 0.25-SCOILSX.125X1.56M -MOD CONF 115 Kx 1.081 HUMx 15.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	2890	.239	11.73	52	12.289	1996	52	78	3	.232	12.1	18	.7	0.0	929
2 25 PCT T	309	.226	13.78	505	14.090	10160	25	330	131	.077	1.9	25	10.1	17.3	368
3 55 PCT T	552	.706	13.64	1069	14.909	19879	65	1973	399	.197	9.5	216	57.9	39.9	221
4 25 PCT T	229	.239	13.93	515	14.195	9888	18	337	129	.077	1.9	26	9.9	17.3	371
5 10 PCT T	200	.969	13.99	230	13.982	7711	12	523	96	.057	.7	30	2.6	6.8	992
6 25 PCT T	216	.227	13.93	520	14.182	10029	17	325	132	.077	1.3	25	10.2	17.3	371
7 90 PCT T	1990	3.310	12.45	968	16.125	22181	227	9197	978	.113	25.7	1039	59.0	63.0	63
8 25 PCT T	208	.263	13.93	510	14.217	9893	14	368	127	.077	1.9	28	9.8	17.3	371
9 C.T.	29960	.275	9.22	15	12.210	1996	999	91	1	.193	63.5	13	.1	0.0	612
1 IDLE	3890	.275	11.99	57	12.693	1996	67	87	3	.232	15.6	20	.7	0.0	929
2 25 PCT T	914	.275	13.93	520	14.252	10070	33	393	132	.077	2.6	30	10.2	17.3	368
3 55 PCT T	629	.690	13.78	1112	14.591	19787	72	1918	906	.197	10.6	208	59.6	38.5	221
4 25 PCT T	280	.263	13.93	520	14.225	9888	22	369	130	.077	1.7	28	10.0	17.3	371
5 10 PCT T	298	.969	13.99	240	13.987	7756	14	525	98	.057	.9	30	2.7	6.8	992
6 25 PCT T	298	.239	13.78	520	14.047	9939	20	362	132	.077	1.5	26	10.2	17.9	371
7 90 PCT T	1972	3.600	12.52	871	16.289	22271	231	9993	927	.113	26.1	1129	98.3	63.0	63
8 25 PCT T	232	.275	13.93	990	14.231	9893	18	389	122	.077	1.9	30	9.9	17.9	371
9 C.T.	25600	.300	8.62	8	11.691	1996	973	103	0	.193	67.7	15	.1	0.0	612

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	16.7	0.0	0	9.9	R	R	.056	R	600	17.9	10.3	1.3	.5	5.2	0.0
2 25 PCT T	19.5	23.2	61	22.9	.965	5.7	.063	.587	2000	15.8	1.6	1.8	6.5	8.2	7.2
3 55 PCT T	8.7	51.5	135	32.8	.637	7.7	.065	.387	2000	15.9	8.1	15.2	37.3	29.9	30.5
4 25 PCT T	19.6	23.2	61	21.8	.938	5.6	.069	.570	2000	15.7	1.2	1.8	6.9	8.5	7.2
5 10 PCT T	17.9	9.1	24	17.0	1.869	5.1	.063	1.137	2000	15.9	.6	2.1	1.7	9.9	2.1
6 25 PCT T	19.6	23.2	61	22.1	.951	5.7	.069	.578	2000	15.7	1.1	1.8	6.5	8.6	7.2
7 90 PCT T	2.5	89.5	222	98.9	.579	5.7	.079	.352	2000	13.5	21.9	73.1	34.8	28.0	38.5
8 25 PCT T	19.6	23.3	61	21.7	.933	5.5	.069	.567	2000	15.4	1.1	2.0	6.3	8.5	7.2
9 C.T.	29.1	0.0	0	9.9	R	R	.058	R	2000	17.9	59.1	.9	.1	3.2	0.0
1 IDLE	16.7	0.0	0	9.9	R	R	.058	R	600	17.3	12.2	1.3	.5	5.2	0.0
2 25 PCT T	19.5	23.3	61	22.2	.956	5.7	.064	.580	2000	15.6	2.0	2.0	6.7	8.7	7.2
3 55 PCT T	8.7	51.6	135	32.6	.632	8.0	.066	.389	2000	15.2	8.3	13.8	34.5	29.3	30.5
4 25 PCT T	19.6	23.3	61	21.8	.937	5.6	.069	.570	2000	15.6	1.3	1.9	6.6	8.5	7.2
5 10 PCT T	17.9	9.1	24	17.1	1.878	5.3	.063	1.142	2000	15.8	.7	2.0	1.8	9.9	2.1
6 25 PCT T	19.6	23.3	61	21.9	.940	5.7	.063	.572	2000	15.8	1.2	1.7	6.7	8.6	7.2
7 90 PCT T	2.5	89.5	222	99.1	.581	5.1	.075	.353	2000	13.3	20.9	74.3	31.9	28.1	38.5
8 25 PCT T	19.6	23.3	61	21.7	.932	5.3	.064	.567	2000	15.6	1.1	2.0	6.2	8.5	7.2
9 C.T.	29.1	0.0	0	9.9	R	R	.055	R	2000	18.1	52.8	1.0	.0	3.2	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 6.9 78 8.5

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 2.0 83 8.3

TWO CYCLE COMPOSITE -

HC- FID	0.35(6.9) + 0.65(2.0) =	3.713	G/KW HR	(5.046 BS)
CO- NDIR	0.35(77.7) + 0.65(82.4) =	80.911	G/KW HR	(60.336 BS)
NOX-CL	0.35(8.5) + 0.65(8.3) =	8.341	G/KW HR	(6.220 BS)
HC + NOX =		15.139	G/KW HR	(11.286 BS)
SFC =		.393	KG/KW HR	(.295 BS)

TABLE C-13. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-119 RUN-1A 08-09-76 25 PCT LOAD-MAN EGR- NO VAC ADV - CONF 115 K= 1.110 HUM= 18.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	998	.312	14.59	670	14.903	9752	33	912	196	33.3	912	161.6	17.2	366
2	2000	900	.263	14.23	535	14.538	10070	31	368	123	31.9	368	136.6	17.3	395
3	2000	336	.239	14.23	920	14.567	10978	28	349	101	27.5	349	111.8	17.3	317
4	2000	272	.300	14.08	310	14.911	10705	23	950	76	22.9	950	84.9	17.3	290
5	2000	320	.376	14.23	205	14.692	11839	29	613	55	29.9	613	61.1	17.3	229
6	2000	368	.312	14.39	185	14.799	11798	33	502	99	33.3	502	69.3	17.5	173

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.08	19.9	23.1	61	21.5	1.98	18.33	6.97	.931	14.9	.067	1.99	29.58	8.68	.566
2	0.39	13.6	23.2	61	22.2	1.90	16.36	5.97	.957	15.3	.065	1.87	21.99	7.33	.582
3	0.79	12.5	23.2	61	23.1	1.22	15.51	9.98	.999	15.3	.065	1.69	20.80	6.00	.605
4	1.18	11.9	23.3	61	23.6	1.62	19.99	3.90	1.015	15.9	.065	1.36	26.80	9.56	.617
5	1.73	8.8	23.2	61	26.1	1.31	27.26	2.95	1.123	15.2	.066	1.75	36.55	3.28	.683
6	1.92	6.8	23.5	62	25.9	1.98	22.32	2.18	1.109	15.1	.066	1.99	29.93	2.92	.672

ID = INTAKE CO2

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-119 RUN-1B 08-09-76 25 PCT LOAD-MAN EGR-WITH VAC ADV- CONF 115 K= 1.110 HUM= 18.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	512	.838	13.99	1572	14.386	8255	33	972	299	33.3	972	332.5	17.9	909
2	2000	1029	.771	13.69	1300	14.527	8301	66	890	297	66.3	890	273.8	17.9	396
3	2000	999	.659	13.78	871	14.596	8528	63	780	170	62.7	780	188.2	17.5	391
4	2000	928	.613	13.78	575	14.998	8800	64	752	116	63.8	752	128.6	17.9	366
5	2000	912	.590	13.78	902	14.923	8890	64	672	82	63.7	672	91.3	17.9	393
6	2000	898	.902	13.78	305	14.278	9299	62	528	66	62.5	528	73.2	17.9	297

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.08	15.9	23.3	61	18.2	1.98	93.19	13.31	.780	15.9	.065	1.98	57.92	17.85	.979
2	0.31	15.6	23.3	61	18.3	2.95	39.55	10.96	.784	15.2	.066	3.95	53.03	14.70	.977
3	0.79	15.9	23.9	61	18.8	2.79	39.68	7.53	.803	15.2	.066	3.79	96.51	10.10	.988
4	1.27	19.9	23.9	61	19.9	2.84	33.91	5.15	.831	15.3	.065	3.80	99.80	6.91	.505
5	1.69	13.5	23.9	61	19.6	2.83	29.86	3.66	.838	15.9	.065	3.79	90.09	4.90	.510
6	2.02	11.7	23.9	61	20.5	2.78	23.99	2.93	.878	15.5	.064	3.72	31.50	3.93	.539

ID = INTAKE CO2

TABLE C-14. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-119 RUN-2A 08-09-76 55 PCT LOAD-MAN EGR- NO VAC ADV - CONF 115 K= 1.113 HUM= 22.6 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	734	.856	14.23	1505	15.170	14379	79	1638	979	79.5	1638	527.1	38.3	216
2	2000	672	.821	14.23	1207	15.128	14560	74	1597	386	73.7	1597	420.3	38.3	196
3	2000	599	.738	14.23	846	15.030	15922	69	1530	288	63.5	1530	320.8	38.2	160
4	2000	368	.415	14.08	630	14.537	15377	44	887	221	44.1	887	296.2	38.2	97
5	2000	432	.497	14.08	620	14.626	15609	52	1071	220	52.3	1071	299.4	38.2	79

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.00	8.5	51.3	135	31.7	1.61	33.10	9.57	.617	14.6	.068	2.15	44.34	12.83	.376
2	0.34	7.7	51.4	135	32.1	1.44	32.26	7.74	.625	14.7	.068	2.00	43.26	10.45	.380
3	0.75	6.3	51.3	135	34.0	1.28	30.41	5.82	.663	14.8	.068	1.72	41.45	7.81	.403
4	1.18	3.8	51.2	134	33.4	.84	17.41	4.47	.662	15.3	.065	1.20	24.82	5.44	.403
5	1.32	3.1	51.2	135	34.4	1.06	21.63	4.44	.671	15.2	.066	1.42	29.01	5.45	.408

ID = INTAKE CO2

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-119 RUN-2B 08-09-76 55 PCT LOAD-MAN EGR-WITH VAC ADV- CONF 115 K= 1.113 HUM= 22.6 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	1224	.648	13.93	2899	14.759	12837	121	1913	837	120.4	1913	931.7	38.2	251
2	2000	1224	.659	13.93	2311	14.728	12796	120	1152	669	120.2	1152	739.0	38.1	246
3	2000	1168	.659	13.93	1702	14.722	12973	117	1173	498	116.8	1173	559.2	38.1	231
4	2000	368	.402	14.08	590	14.523	15649	45	879	211	45.0	879	239.4	38.1	79
5	2000	498	.469	14.34	570	14.910	16057	55	1020	209	54.4	1020	226.8	38.1	76

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.00	9.4	51.2	134	28.3	2.44	29.50	16.91	.553	15.0	.067	3.27	32.85	22.68	.336
2	0.47	9.7	51.1	134	28.1	2.43	23.27	13.91	.550	15.0	.066	3.26	31.21	17.44	.334
3	0.74	9.1	51.1	134	28.6	2.36	23.70	10.06	.560	15.1	.066	3.16	31.78	13.44	.340
4	1.18	3.1	51.2	134	34.5	.91	17.66	4.26	.674	15.3	.065	1.22	23.64	5.72	.410
5	1.32	3.0	51.2	134	35.4	1.11	20.62	4.12	.692	14.9	.067	1.44	27.65	5.52	.421

ID = INTAKE CO2

TABLE C-15. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-119 RUN-3A 08-09-76 10 PCT LOAD-MAN EGR- NO VAC ADV - CONF 115 K= 1.109 HUM= 29.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CRW	VAC. HR
1	2000	399	.590	13.69	390	19.218	7893	22	605	63	21.6	605	69.1	6.9	937
2	2000	320	.583	13.93	285	19.550	8029	20	650	52	20.0	650	57.6	6.9	919
3	2000	309	.969	19.08	235	19.589	8396	20	592	45	19.7	592	49.3	6.9	909
4	2000	320	.376	19.08	175	19.492	8669	22	953	35	21.7	953	38.3	6.9	868
5	2000	320	.337	13.93	138	19.303	9117	23	939	29	23.1	939	32.2	6.9	833
6	2000	560	.216	13.78	100	19.059	10029	45	311	29	45.1	311	26.1	6.9	291

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	CALC F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	0.08	17.2	9.3	29	17.9	2.90	67.21	6.96	1.876	15.6	.069	3.22	90.19	9.39	1.191
2	0.39	16.5	9.3	29	17.7	2.23	70.27	5.80	1.905	15.3	.066	2.98	96.88	7.78	1.159
3	0.75	15.9	9.3	29	18.9	2.19	60.26	4.55	1.980	15.2	.066	2.99	80.80	6.65	1.209
4	1.23	19.5	9.3	29	19.1	2.91	50.38	3.86	2.055	15.3	.065	3.23	67.57	5.18	1.250
5	1.59	13.1	9.3	29	20.1	2.57	48.23	3.29	2.163	15.5	.064	3.99	69.67	4.35	1.316
6	2.12	9.5	9.3	29	22.1	5.01	39.52	2.63	2.378	15.8	.063	6.72	66.29	3.53	1.997

ID = INTAKE CO2

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-119 RUN-3B 08-09-76 10 PCT LOAD-MAN EGR-WITH VAC ADV- CONF 115 K= 1.109 HUM= 29.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CRW	VAC. HR
1	2000	560	.590	13.35	770	13.953	6078	28	975	111	27.5	975	122.9	6.9	965
2	2000	599	.511	12.93	550	13.502	6577	30	503	89	29.8	503	98.2	6.9	962
3	2000	576	.997	13.35	935	13.912	6991	30	965	67	30.1	965	73.8	6.9	950
4	2000	690	.590	13.99	280	14.102	6809	35	526	45	34.9	526	49.5	6.9	999
5	2000	680	.613	13.69	200	14.330	7031	38	608	33	37.8	608	36.0	6.9	922
6	2000	1488	.690	13.07	115	13.928	7575	91	758	21	91.2	758	22.9	6.9	361

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	CALC F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	0.08	18.3	9.3	29	13.9	3.04	52.75	12.37	1.991	15.9	.063	9.10	70.79	16.59	.876
2	0.47	18.2	9.3	29	19.5	3.31	55.87	9.88	1.560	16.9	.061	9.99	79.92	13.25	.999
3	0.79	17.7	9.3	29	19.2	3.39	51.69	7.93	1.528	15.9	.063	9.98	69.29	9.96	.929
4	1.23	17.5	9.3	29	15.0	3.88	58.92	9.98	1.619	15.7	.064	5.20	78.35	6.68	.982
5	1.69	16.6	9.3	29	15.5	9.20	67.51	3.62	1.668	15.5	.065	5.63	90.59	4.85	1.015
6	2.17	19.2	9.3	29	16.7	10.19	89.25	2.31	1.797	15.8	.063	13.59	112.98	3.09	1.093

ID = INTAKE CO2

TABLE C-16. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-01 TEST-119 RUN-4 08-09-76 90 PCT LOAD-MAN EGR- NO VAC ADV - CONF 115 K= 1.106 HUM= 29.1 G/KG

		CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				VAC.
MODE	RPM	HC-FID	CO	CO2	NOX-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOX-CL	CKW	MM
1	2000	1696	9.960	11.99	850	14.695	22095	259	11931	379	258.8	11931	913.2	62.9	63
2	2000	1856	6.130	11.29	315	17.585	23905	287	16981	139	286.7	16981	153.9	62.9	25

		-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------								---CALC---		-------G/KW HR------			SFC
MODE	ID	MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	HC	CO	NOX	KG/KW HR
1	0.08	2.5	83.6	220	48.6	3.19	197.30	9.61	.581	12.9	.077	9.28	197.59	6.19	.353
2	0.35	1.0	83.6	220	51.6	3.59	203.96	1.72	.617	12.1	.083	9.75	272.85	2.30	.375

ID = INTAKE CO2

TABLE C-17. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-122 RUN-01 08-18-76 BPEGR 0.53-7COILSX.063X2.93H -MOD CONF 11S K= 1.093 HUM= 16.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	2560	.251	11.86	59	12.396	1860	93	76	3	.232	9.9	18	.7	0.0	919
2 25 PCT T	309	.227	13.69	330	13.902	10659	26	352	92	.077	2.0	27	7.1	17.9	320
3 55 PCT T	972	.679	13.78	550	14.508	15921	59	1995	219	.197	8.6	220	32.2	37.8	132
4 25 PCT T	200	.251	13.93	315	14.209	10933	17	373	84	.077	1.3	29	6.5	17.9	323
5 10 PCT T	192	.469	13.69	225	14.131	7076	11	475	91	.057	.6	27	2.3	6.8	950
6 25 PCT T	192	.216	13.78	335	14.017	10478	16	376	91	.077	1.2	25	7.0	17.9	320
7 90 PCT T	1669	5.990	11.98	980	17.112	22952	258	19739	239	.113	29.2	1665	26.9	42.0	56
8 25 PCT T	192	.227	13.93	310	14.170	10387	16	337	82	.077	1.2	26	6.3	17.9	320
9 C.T.	19200	.275	10.07	10	12.999	1860	319	89	1	.193	99.9	12	.1	0.0	607
1 IDLE	3072	.275	12.12	93	12.738	1860	50	81	2	.232	11.6	19	.5	0.0	919
2 25 PCT T	900	.275	13.78	340	14.100	10669	34	417	92	.077	2.6	32	7.1	17.9	320
3 55 PCT T	594	.693	13.93	570	14.635	15830	67	1906	229	.197	9.8	207	32.9	37.9	132
4 25 PCT T	298	.251	13.93	310	14.209	10387	21	371	82	.077	1.6	29	6.3	17.9	320
5 10 PCT T	200	.469	13.69	193	14.132	6985	11	460	35	.057	.6	27	2.0	6.8	950
6 25 PCT T	290	.227	13.93	310	14.185	10933	20	338	83	.077	1.5	26	6.9	17.9	320
7 90 PCT T	1728	5.570	11.29	950	17.010	22997	270	15212	221	.113	30.5	1719	25.0	42.0	56
8 25 PCT T	208	.275	13.93	290	14.229	10387	17	406	77	.077	1.3	31	5.9	17.9	320
9 C.T.	19200	.275	9.93	10	11.798	1860	330	88	1	.193	97.2	13	.1	0.0	607

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CTD	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	16.5	0.0	0	9.1	R	R	.056	R	600	17.7	10.0	.9	.8	9.7	0.0
2 25 PCT T	12.6	23.3	61	23.5	1.008	9.0	.063	.613	2000	16.0	2.0	1.3	8.0	8.9	7.3
3 55 PCT T	5.2	50.7	133	35.1	.693	9.9	.065	.921	2000	15.3	8.7	10.7	36.9	25.3	30.3
4 25 PCT T	12.7	23.3	61	23.0	.982	3.7	.064	.600	2000	15.6	1.3	1.9	7.3	8.7	7.3
5 10 PCT T	17.7	9.1	24	15.6	1.711	9.5	.064	1.090	2000	15.7	.6	1.3	2.6	9.9	2.1
6 25 PCT T	12.6	23.3	61	23.1	.990	9.0	.063	.602	2000	15.8	1.3	1.2	7.9	8.7	7.3
7 90 PCT T	2.2	83.2	218	50.6	.608	2.8	.080	.370	2000	12.5	29.9	81.3	29.8	28.0	30.3
8 25 PCT T	12.6	23.3	61	22.9	.981	3.6	.064	.597	2000	15.7	1.2	1.3	7.2	8.6	7.3
9 C.T.	23.9	0.0	0	9.1	R	R	.058	R	2000	17.2	95.9	.6	.1	2.9	0.0
1 IDLE	16.5	0.0	0	9.1	R	R	.058	R	600	17.3	10.9	.9	.6	9.7	0.0
2 25 PCT T	12.6	23.9	61	23.3	.997	9.0	.064	.606	2000	15.7	2.9	1.5	8.3	8.9	7.3
3 55 PCT T	5.2	50.8	133	34.9	.687	9.5	.066	.918	2000	15.2	9.2	9.8	38.2	25.2	30.9
4 25 PCT T	12.6	23.3	61	22.9	.981	3.6	.064	.597	2000	15.6	1.5	1.9	7.3	8.7	7.3
5 10 PCT T	17.7	9.1	24	15.9	1.686	3.8	.064	1.025	2000	15.7	.6	1.3	2.3	9.3	2.1
6 25 PCT T	12.6	23.3	61	23.0	.986	3.6	.064	.599	2000	15.7	1.9	1.2	7.4	8.7	7.3
7 90 PCT T	2.2	83.2	218	50.7	.610	2.7	.080	.371	2000	12.5	28.6	81.8	29.0	28.1	30.2
8 25 PCT T	12.6	23.3	61	22.9	.982	3.3	.064	.593	2000	15.6	1.2	1.5	6.9	8.7	7.3
9 C.T.	23.9	0.0	0	9.1	R	R	.055	R	2000	18.1	99.2	.6	.1	2.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 5.5 113 9.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 5.9 116 9.8

TWO CYCLE COMPOSITE -

HC- FID	0.35(5.5) + 0.65(5.9) =	5.744	G/KW HR	(9.298 GS)
CO- NDIR	0.35(113.5) + 0.65(116.9) =	115.369	G/KW HR	(86.030 GS)
NOX-CL	0.35(9.9) + 0.65(9.8) =	9.819	G/KW HR	(3.599 GS)
HC + NOX =		10.583	G/KW HR	(7.892 GS)
SFC =		.585	KG/KW HR	(.830 GS)

TABLE C-18. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-123 RUN-01 08-23-76 CARB-RPEGR-HEI MAIXCT-19BTDC-.531X7COIL K= 1.099 HUM= 16.6 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	2290	.115	9.01	95	9.367	1905	99	97	3	.232	11.5	11	.8	0.0	922
2 25 PCT T	399	.197	11.29	250	11.926	11929	90	311	95	.077	3.1	29	7.3	17.9	262
3 55 PCT T	256	.197	11.99	500	12.166	16289	38	399	293	.197	5.4	59	35.7	38.6	86
4 25 PCT T	176	.109	11.29	290	11.363	11889	20	219	91	.077	1.6	17	7.0	17.9	262
5 10 PCT T	199	.093	10.76	150	10.873	8890	17	153	95	.057	.9	9	2.5	6.8	361
6 25 PCT T	192	.093	11.00	220	11.119	11793	22	199	85	.077	1.7	15	6.5	17.9	262
7 90 PCT T	176	1.970	13.93	360	15.820	23133	29	5529	191	.113	3.3	629	21.6	63.3	98
8 25 PCT T	199	.093	11.98	190	11.589	11798	16	190	70	.077	1.2	15	5.9	17.9	262
9 C.T.	99800	.159	1.49	7	6.905	1996	1920	100	1	.193	203.0	19	.1	0.0	605
1 IDLE	1740	.125	9.01	19	9.326	1905	39	52	1	.232	9.0	12	.3	0.0	922
2 25 PCT T	900	.115	11.29	190	11.399	11798	96	238	71	.077	3.5	18	5.5	17.9	262
3 55 PCT T	288	.197	11.99	950	12.170	16375	93	901	220	.197	6.3	59	32.3	38.6	89
4 25 PCT T	200	.099	11.98	190	11.600	11657	22	200	69	.077	1.7	15	5.3	17.9	262
5 10 PCT T	229	.093	10.74	150	10.878	8936	20	159	95	.057	1.2	9	2.6	6.8	361
6 25 PCT T	200	.093	11.98	240	11.595	11612	22	188	87	.077	1.7	19	6.7	17.9	262
7 90 PCT T	199	1.870	13.93	380	15.821	23269	31	5556	203	.113	3.5	628	22.9	63.9	98
8 25 PCT T	128	.093	11.98	230	11.587	11567	19	187	83	.077	1.1	19	6.9	17.5	262
9 C.T.	93520	.197	1.88	5	6.941	1996	1370	92	1	.193	195.8	13	.1	0.0	607

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOx	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 I		16.6	0.0	0	9.2	R	R	.093	R	600	23.2	9.9	1.9	.9	9.5	0.0
2 25		10.3	23.3	61	26.3	1.128	9.1	.052	.686	2000	19.2	1.3	3.0	8.9	9.3	7.2
3 55		3.9	51.8	136	35.9	.693	9.8	.055	.922	2000	18.1	2.9	7.9	91.1	29.2	30.6
4 25		10.3	23.9	61	26.2	1.122	9.0	.052	.682	2000	19.3	.7	2.1	8.1	9.3	7.2
5 10		19.2	9.1	24	19.6	2.193	9.9	.050	1.303	2000	20.2	.9	1.1	2.9	5.1	2.1
6 25		10.3	23.9	61	26.0	1.112	9.7	.051	.677	2000	19.8	.7	1.9	7.5	9.2	7.2
7 90		1.9	84.9	223	51.0	.601	2.3	.072	.366	2000	13.9	1.9	79.3	29.8	26.9	38.5
8 25		10.3	23.9	61	25.9	1.107	9.0	.053	.673	2000	19.0	.5	1.9	6.2	9.1	7.2
9 CT		23.8	0.0	0	9.9	R	R	.032	R	2000	31.9	87.5	1.8	.1	2.9	0.0
1 I		16.6	0.0	0	9.2	R	R	.093	R	600	23.3	9.0	1.5	.9	9.5	0.0
2 25		10.3	23.9	61	25.9	1.108	9.1	.052	.679	2000	19.3	1.4	2.3	6.7	9.2	7.2
3 55		3.5	51.8	136	36.1	.696	9.3	.055	.929	2000	18.1	2.8	7.5	39.3	29.9	30.5
4 25		10.3	23.9	61	25.7	1.099	9.0	.053	.669	2000	19.0	.8	2.0	6.5	9.1	7.2
5 10		19.2	9.2	24	19.7	2.152	5.0	.050	1.309	2000	20.2	.5	1.1	3.1	5.2	2.1
6 25		10.3	23.9	61	25.6	1.099	9.8	.053	.666	2000	19.0	.9	1.8	8.2	9.1	7.2
7 90		1.9	85.0	223	51.3	.603	2.9	.072	.367	2000	13.9	1.6	80.1	27.9	26.7	38.5
8 25		10.3	23.9	62	25.5	1.088	9.6	.053	.662	2000	19.0	.5	1.8	7.8	9.0	7.2
9 CT		23.9	0.0	0	9.9	R	R	.032	R	2000	31.2	87.5	1.7	.1	2.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------			12.7	93	9.8
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------			12.2	93	9.5
TWO CYCLE COMPOSITE -	HC- FID 0.35(12.7) + 0.65(12.2) =	12.395	G/KW HR	(9.293 BS)	
	CO- NDIR 0.35(93.1) + 0.65(92.8) =	92.903	G/KW HR	(31.993 BS)	
	NOx-CL 0.35(9.8) + 0.65(9.5) =	9.585	G/KW HR	(3.919 BS)	
	HC + NOX =	14.980	G/KW HR	(12.662 BS)	
	SFC =	.531	KG/KW HR	(.872 BS)	

ID =

TABLE C-19. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HO ENGINE---PROJECT 11-9311

ENGINE-1 TEST-129 RUN-01 08-26-76 CARB-PL-HEI WATALLMODES-14BTDC ENG. CHECK K= 1.097 HUM= 16.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-LL	CKW	VAC. MM
1 IDLE	929	.197	9.22	47	9.919	1860	9	59	3	.232	2.1	14	.8	0.0	929
2 25 PCT T	120	.129	11.00	950	11.137	10659	13	290	157	.077	1.0	18	12.1	17.9	395
3 55 PCT T	80	.136	12.25	980	12.395	15968	11	399	995	.197	1.6	51	65.9	38.5	201
4 25 PCT T	56	.077	11.24	980	11.323	10419	6	196	169	.077	.9	11	12.6	17.9	395
5 10 PCT T	90	.072	10.76	290	10.836	8210	3	110	66	.057	.2	6	3.8	6.8	922
6 25 PCT T	62	.072	11.12	960	11.199	10419	6	137	159	.077	.5	11	12.2	17.9	395
7 90 PCT T	36	.995	14.96	550	15.805	22725	6	2743	288	.113	.7	310	32.5	62.7	58
8 25 PCT T	32	.067	11.24	980	11.310	10978	3	129	162	.077	.3	10	12.5	17.9	395
9 C.T.	38400	.170	2.17	10	6.263	1905	1193	109	1	.193	170.6	15	.2	0.0	612
1 IDLE	1120	.170	9.93	50	9.722	1960	23	66	3	.232	5.9	15	.8	0.0	929
2 25 PCT T	180	.082	11.00	960	11.102	10419	19	159	160	.077	1.5	12	12.3	17.9	395
3 55 PCT T	180	.136	12.52	1016	12.677	15699	25	391	958	.197	3.7	50	67.3	38.5	203
4 25 PCT T	132	-.072	11.12	500	11.206	10523	19	136	171	.077	1.1	10	13.2	17.9	395
5 10 PCT T	98	.072	10.53	230	10.613	8165	8	112	64	.057	.5	6	3.7	6.8	922
6 25 PCT T	109	.072	11.00	975	11.083	10569	11	138	165	.077	.8	11	12.7	17.9	395
7 90 PCT T	70	.871	14.54	590	15.419	22816	12	2603	318	.113	1.3	299	36.9	62.7	58
8 25 PCT T	60	.061	11.24	990	11.308	10978	6	115	165	.077	.5	9	12.7	17.9	395
9 C.T.	38400	.159	2.17	9	6.251	1905	1195	98	1	.193	170.9	14	.1	0.0	612

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1	I	16.9	0.0	0	9.1	R	R	.093	R	600	23.1	1.2	3.1	.5	9.7	0.0
2	25	13.6	23.3	61	23.5	1.010	6.8	.051	.619	2000	19.7	.5	9.1	7.9	8.8	7.2
3	55	7.9	51.6	135	39.1	.661	8.7	.056	.902	2000	17.8	.9	11.9	93.0	29.5	30.6
4	25	13.6	23.3	61	23.9	1.006	7.1	.051	.612	2000	19.9	.3	2.5	8.3	8.8	7.2
5	10	14.6	9.1	24	18.1	1.986	7.9	.099	1.208	2000	20.3	.1	1.9	2.5	5.0	2.1
6	25	13.6	23.3	61	23.9	1.005	6.9	.051	.611	2000	19.6	.3	2.9	8.0	8.8	7.2
7	90	2.3	84.0	221	50.1	.596	3.5	.071	.363	2000	19.1	.9	69.6	21.9	27.7	38.3
8	25	13.6	23.3	61	23.1	.991	7.0	.051	.603	2000	19.9	.1	2.2	8.2	8.7	7.2
9	CT	29.1	0.0	0	9.2	R	R	.031	R	2000	32.9	96.2	3.9	.1	2.9	0.0
1	I	16.9	0.0	0	9.1	R	R	.095	R	600	22.9	2.9	3.6	.5	9.6	0.0
2	25	13.6	23.3	61	23.9	1.005	7.0	.051	.611	2000	19.8	.8	2.9	7.8	8.8	7.2
3	55	8.0	51.4	136	39.6	.670	9.0	.057	.908	2000	17.9	2.0	11.9	92.9	29.8	30.6
4	25	13.6	23.3	61	23.2	.996	7.9	.051	.606	2000	19.6	.6	2.5	8.3	8.7	7.2
5	10	14.6	9.1	24	18.0	1.975	7.2	.098	1.201	2000	20.7	.3	1.5	2.3	5.0	2.1
6	25	13.6	23.3	61	23.3	1.000	7.2	.050	.609	2000	19.8	.5	2.5	8.0	8.7	7.2
7	90	2.3	84.0	221	50.3	.598	3.8	.069	.369	2000	19.9	.7	69.7	22.6	27.7	38.3
8	25	13.6	23.3	61	23.1	.991	7.2	.051	.603	2000	19.9	.3	2.1	8.0	8.7	7.2
9	CT	29.1	0.0	0	9.2	R	R	.031	R	2000	32.5	92.1	3.3	.1	2.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 9.7 29 8.3

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 10.2 23 8.7

TWO CYCLE COMPOSITE -

HC- FID	0.35(9.7) + 0.65(10.2) =	10.015	G/KW	HR	(7.469 GS)
CO- NDIR	0.35(29.4) + 0.65(23.1) =	23.569	G/KW	HR	(17.575 GS)
NOx-CL	0.35(8.3) + 0.65(8.7) =	8.572	G/KW	HR	(6.392 GS)
	HC + NOX =	18.587	G/KW	HR	(13.860 GS)
	SFC =	.503	KG/KW	HR	(.827 GS)

ID =

TABLE C-20. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-130 RUN-01 09-07-76 CARB-PL-HEI 9BTDC IDLE K= 1.088 HUM= 16.0 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CRN	VAC. MM
1	600	720	.227	13.21	57	13.518	1905	11	65	3	11.9	65	2.9	0.0	937
2	600	690	.115	9.22	40	9.489	2091	15	50	3	15.1	50	3.1	0.0	937

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	NO	17.2	0.0	0	9.2	R	R	R	R	16.9	.061	R	R	R	R
2	YES	17.2	0.0	0	9.5	R	R	R	R	23.2	.043	R	R	R	R

ID = AIR INJ.

TABLE C-21. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-130 RUN-02 09-07-76 CARB-PL-HEI 19BTDC M1+2-30R M3+4 10 PCT K= 1.088 HUM= 16.0 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CRN	VAC. MM
1	2000	184	.902	19.23	295	19.653	7756	11	930	93	11.1	930	96.8	6.8	999
2	2000	68	.082	10.91	178	10.500	7666	5	121	93	5.9	121	96.9	6.8	999
3	2000	180	.227	13.78	380	14.028	6260	9	205	56	9.1	205	61.2	6.8	983
4	2000	200	.115	9.93	260	9.566	6219	14	150	54	14.1	150	61.0	6.8	983

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	NO	17.5	9.1	29	17.1	1.23	97.73	9.78	1.883	15.2	.066	1.65	69.00	6.92	1.196
2	YES	17.5	9.1	29	16.9	.61	13.49	9.79	1.858	20.9	.048	.81	18.04	6.93	1.130
3	NO	19.0	9.1	29	13.8	1.01	22.77	6.26	1.517	15.8	.063	1.35	30.54	8.39	.923
4	YES	19.0	9.1	29	13.7	1.57	16.69	6.23	1.505	22.9	.044	2.11	22.39	8.36	.915

ID = AIR INJ.

TABLE C-22. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-130 RUN-03 09-07-76 CARB-PL-HEI-MEGR,53 30BTDC-MAI 25 PCT K= 1.091 HUM= 16.3 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CRW	VAL. MM
1	2000	280	.198	10.53	710	10.759	8301	29	309	182	23.7	309	190.5	17.3	929
2	2000	990	.181	10.76	540	10.990	8982	37	283	138	37.9	283	151.0	17.3	909
3	2000	360	.187	10.76	900	10.987	8573	31	295	109	30.9	295	113.1	17.9	919
4	2000	360	.170	10.76	300	10.970	8890	32	278	81	32.1	278	88.1	17.9	366
5	2000	560	.170	10.76	175	10.992	9389	53	293	50	52.7	293	59.2	17.9	300
6	2000	960	.193	10.69	150	10.938	9935	91	336	93	91.1	336	96.9	17.9	257

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CMP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	0.08	16.7	23.2	61	18.3	1.03	13.99	7.91	.787	20.9	.099	1.38	18.03	10.60	.979
2	0.51	16.1	23.3	61	18.7	1.63	12.28	6.02	.809	20.0	.050	2.14	16.97	8.07	.984
3	0.93	16.3	23.3	61	18.9	1.35	12.81	9.51	.812	20.0	.050	1.80	17.18	6.09	.999
4	1.23	14.9	23.3	61	19.6	1.90	12.09	3.51	.892	20.0	.050	1.87	17.22	9.71	.512
5	1.69	11.8	23.3	61	20.7	2.29	12.75	2.16	.889	19.9	.050	3.07	17.09	2.89	.591
6	1.83	10.1	23.3	61	20.8	3.96	14.59	1.87	.892	20.0	.050	5.31	19.57	2.50	.592

ID = INTAKE CO2

TABLE C-23. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-130 RUN-09 09-07-76 CARB-PL-HEI-MEGR,53 29BTDC-MAI 55 PCT K= 1.091 HUM= 16.3 G/KG

MODE	PPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-LL	CRW	VAL. MM
1	2000	280	.227	11.86	1960	12.119	13290	39	509	532	39.1	509	580.2	38.6	267
2	2000	280	.198	11.86	1190	12.090	13381	39	499	322	39.9	499	360.9	38.6	296
3	2000	280	.181	11.99	850	12.202	13562	35	407	319	39.6	407	392.3	38.6	211
4	2000	280	.159	11.99	650	12.180	13653	35	359	292	39.9	359	269.0	38.6	175
5	2000	320	.131	11.86	500	12.026	19016	91	308	193	91.9	308	211.2	38.6	129

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CMP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	0.08	10.5	51.6	136	29.3	.67	9.88	10.92	.567	18.2	.055	.90	13.25	13.98	.395
2	0.93	9.7	51.7	136	29.5	.68	8.70	8.27	.570	18.2	.055	.91	11.66	11.09	.397
3	0.88	8.3	51.8	136	29.9	.68	7.99	6.15	.577	18.1	.055	.91	10.70	8.25	.351
4	1.23	6.9	51.8	136	30.1	.68	7.09	9.79	.581	18.1	.055	.92	9.99	6.36	.353
5	1.36	9.9	51.7	136	30.9	.91	6.09	3.79	.597	18.3	.055	1.09	8.10	5.09	.363

ID = INTAKE CO2

TABLE C-24. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-130 RUN-05 09-07-76 CARB-PL-MEI-MEGR.53 19BTDC-MAI 90 PCT K= 1.098 HUM= 17.0 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	160	.525	15.02	660	15.569	21319	25	1953	300	25.1	1953	329.5	63.0	63
2	2000	800	2.100	13.93	320	16.122	23591	139	6199	155	139.1	6199	170.3	63.3	36

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	0.08	2.5	89.9	222	47.0	.38	17.51	3.62	.557	14.3	.070	.91	23.98	9.85	.339
2	0.27	1.9	89.9	223	51.9	1.62	79.63	1.87	.611	13.7	.073	2.17	100.08	2.61	.372

ID = INTAKE CO2

TABLE C-25. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-130 RUN-06 09-07-76 CARB-PL-MEI 19BTDC-NOAI M1+2 CT K= 1.098 HUM= 17.0 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	25600	.350	8.81	17	11.937	1860	933	110	1	932.6	110	1.0	0.0	610
2	2000	900	.061	12.79	101	12.896	9990	17	98	13	17.3	98	14.2	0.0	516
3	2000	990	.061	8.33	69	8.939	9990	28	73	13	28.0	73	13.8	0.0	516
4	2000	900	.061	8.33	73	8.939	9899	25	72	14	25.0	72	15.5	0.0	939

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	600	29.0	0.0	0	9.1	R	R	R	R	17.7	.056	R	R	R	R
2	1900	20.3	0.0	0	11.0	R	R	R	R	17.2	.058	R	R	R	R
3	1900	20.3	0.0	0	11.0	R	R	R	R	25.7	.039	R	R	R	R
4	1900	17.3	0.0	0	10.8	R	R	R	R	25.7	.039	R	R	R	R

ID = NLRPM

TABLE C-26. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

ENGINE-1 TEST-130 RUN-1X 1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
09-07-76 CARB-PL-HEI MEGR.53-MAIXM1,5,9-19,29,30B K= 1.085 MUM= 15.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CALC. MM
1 IDLE	720	.227	13.21	57	13.518	1905	11	65	3	.232	2.6	15	.7	0.0
2 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9
3 55 PCT T	280	.159	11.99	650	12.180	13653	35	359	262	.197	5.1	53	38.6	38.6
4 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9
5 10 PCT T	180	.227	13.78	380	14.028	6260	9	205	61	.057	.5	12	3.5	6.8
6 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9
7 90 PCT T	160	.525	15.02	660	15.569	21319	25	1953	326	.113	2.8	169	36.8	63.0
8 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9
9 C.T.	25600	.350	8.81	17	11.937	1860	933	110	1	.193	61.9	16	.1	0.0
1 IDLE	720	.227	13.21	57	13.518	1905	11	65	3	.232	2.6	15	.7	0.0
2 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9
3 55 PCT T	280	.159	11.99	650	12.180	13653	35	359	262	.197	5.1	53	38.6	38.6
4 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9
5 10 PCT T	180	.227	13.78	380	14.028	6260	9	205	61	.057	.5	12	3.5	6.8
6 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9
7 90 PCT T	160	.525	15.02	660	15.569	21319	25	1953	326	.113	2.8	169	36.8	63.0
8 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9
9 C.T.	25600	.350	8.81	17	11.937	1860	933	110	1	.193	61.9	16	.1	0.0

----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE----

MODE	ID	MV	CMP	CTO	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	PERCENT OF TOTAL HC	CO	NOX	FUEL	POWER
1 I	0.00	17.2	0.0	0	9.2	R	R	.061	R	600	16.9	3.2	9.9	.6	5.9	0.0
2 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	3.0	6.2	6.3	8.3	7.2
3 55	1.23	6.9	51.8	136	30.1	.581	5.1	.055	.353	2000	18.1	6.2	15.3	36.2	29.9	30.7
4 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	3.0	6.2	6.3	8.3	7.2
5 10	0.00	19.0	9.1	29	13.8	1.517	6.8	.063	.923	2000	15.8	.6	3.9	3.3	9.3	2.1
6 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	3.0	6.2	6.3	8.3	7.2
7 90	0.00	2.5	89.9	222	97.0	.557	3.9	.070	.339	2000	19.3	3.9	97.6	39.5	29.9	38.9
8 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	3.0	6.2	6.3	8.3	7.2
9 CT	0.00	29.0	0.0	0	9.1	R	R	.056	R	2000	17.7	79.6	9.6	.1	3.2	0.0
1 I	0.00	17.2	0.0	0	9.2	R	R	.061	R	600	16.9	3.2	9.9	.6	5.9	0.0
2 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	3.0	6.2	6.3	8.3	7.2
3 55	1.23	6.9	51.8	136	30.1	.581	5.1	.055	.353	2000	18.1	6.2	15.3	36.2	29.9	30.7
4 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	3.0	6.2	6.3	8.3	7.2
5 10	0.00	19.0	9.1	29	13.8	1.517	6.8	.063	.923	2000	15.8	.6	3.9	3.3	9.3	2.1
6 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	3.0	6.2	6.3	8.3	7.2
7 90	0.00	2.5	89.9	222	97.0	.557	3.9	.070	.339	2000	19.3	3.9	97.6	39.5	29.9	38.9
8 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	3.0	6.2	6.3	8.3	7.2
9 CT	0.00	29.0	0.0	0	9.1	R	R	.056	R	2000	17.7	79.6	9.6	.1	3.2	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 9.5 19 5.8
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 9.5 19 5.8

TWO CYCLE COMPOSITE -

HC- FID	0.35(9.5) + 0.65(9.5) =	9.542	G/KW HR	(3.387 G/HP HR)
CO- NDIR	0.35(18.9) + 0.65(18.9) =	18.911	G/KW HR	(14.102 G/HP HR)
NOX-CL	0.35(5.8) + 0.65(5.8) =	5.802	G/KW HR	(4.326 G/HP HR)
	HC + NOX =	10.384	G/KW HR	(7.743 G/HP HR)
	SFC =	.999	KG/KW HR	(.749 G/HP HR)

ID = INTAKE CO2

TABLE C-27. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-130 RUN-2X 09-07-76 SAME AS RUN 1 EXCEPT WITH 1400NLHPM AT CT K= 1.085 NUM= 15.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-LL	CPM	VAL. MM
1 IDLE	720	.227	13.21	57	13.518	1905	11	65	3	.232	2.6	15	.7	0.0	937
2 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9	366
3 55 PCT T	280	.159	11.99	650	12.180	13653	35	359	262	.197	5.1	53	38.6	38.6	175
4 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9	366
5 10 PCT T	180	.227	13.78	380	14.028	6260	9	205	61	.057	.5	12	3.5	6.8	983
6 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9	366
7 90 PCT T	160	.525	15.02	660	15.569	21319	25	1953	326	.113	2.8	169	36.8	63.0	63
8 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9	366
9 C.T.	900	.061	12.79	101	12.896	9990	17	98	19	.193	2.5	7	2.0	0.0	516
1 IDLE	720	.227	13.21	57	13.518	1905	11	65	3	.232	2.6	15	.7	0.0	937
2 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9	366
3 55 PCT T	280	.159	11.99	650	12.180	13653	35	359	262	.197	5.1	53	38.6	38.6	175
4 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9	366
5 10 PCT T	180	.227	13.78	380	14.028	6260	9	205	61	.057	.5	12	3.5	6.8	983
6 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9	366
7 90 PCT T	160	.525	15.02	660	15.569	21319	25	1953	326	.113	2.8	169	36.8	63.0	63
8 25 PCT T	360	.170	10.76	300	10.970	8890	32	278	88	.077	2.5	21	6.7	17.9	366
9 C.T.	900	.061	12.79	101	12.896	9990	17	98	19	.193	2.5	7	2.0	0.0	516

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	SFC BSFC	BSNOX	F/A	KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	PUMP
1 I	0.08	17.2	0.0	0	9.2	R	R	.061	R	600	16.9	11.3	9.5	.6	5.1	0.0
2 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	10.5	6.9	6.2	7.9	7.2
3 55	1.23	6.9	51.8	136	30.1	.581	5.1	.055	.353	2000	18.1	21.8	15.7	35.6	23.2	30.7
4 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	10.5	6.9	6.2	7.9	7.2
5 10	0.08	19.0	9.1	29	13.8	1.517	6.8	.063	.923	2000	15.8	2.2	3.5	3.2	9.1	2.1
6 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	10.5	6.9	6.2	7.9	7.2
7 90	0.08	2.5	89.9	222	97.0	.557	3.9	.070	.339	2000	19.3	12.1	98.8	33.9	27.8	38.9
8 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	10.5	6.9	6.2	7.9	7.2
9 CT	0.08	20.3	0.0	0	11.0	R	R	.058	R	2000	17.2	10.5	2.0	1.9	8.2	0.0
1 I	0.08	17.2	0.0	0	9.2	R	R	.061	R	600	16.9	11.3	9.5	.6	5.1	0.0
2 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	10.5	6.9	6.2	7.9	7.2
3 55	1.23	6.9	51.8	136	30.1	.581	5.1	.055	.353	2000	18.1	21.8	15.7	35.6	23.2	30.7
4 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	10.5	6.9	6.2	7.9	7.2
5 10	0.08	19.0	9.1	29	13.8	1.517	6.8	.063	.923	2000	15.8	2.2	3.5	3.2	9.1	2.1
6 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	10.5	6.9	6.2	7.9	7.2
7 90	1.23	2.5	89.9	222	97.0	.557	3.9	.070	.339	2000	19.3	12.1	98.8	33.9	27.8	38.9
8 25	1.23	19.9	23.3	61	19.6	.892	3.8	.050	.512	2000	20.0	10.5	6.9	6.2	7.9	7.2
9 CT	0.08	20.3	0.0	0	11.0	R	R	.058	R	2000	17.2	10.5	2.0	1.9	8.2	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------			1.1	18	5.9
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------			1.3	18	5.9
TWO CYCLE COMPOSITE -	HC- FID 0.35(1.3) + 0.65(1.3) =	1.288	G/KW HR	(.960 G/HP HR)	
	CO- NDIR 0.35(18.4) + 0.65(18.4) =	18.429	G/KW HR	(13.739 G/HP HR)	
	NOX-CL 0.35(5.9) + 0.65(5.9) =	5.905	G/KW HR	(4.403 G/HP HR)	
	HC + NOX =	7.232	G/KW HR	(5.393 G/HP HR)	
	SFC =	.969	KG/KW HR	(.769 LB/HP HR)	

ID = INTAKE CO2

3 OF 5
PB
273427

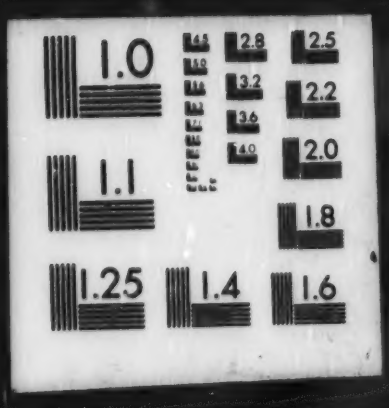


TABLE C-28. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-131 RUN-01 10-09-76 POST OVERHAUL BASELINE - CARBURETOR 6607 K= 1.093 HUM= 16.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1920	.263	11.36	53	11.836	1950	35	80	3	.232	8.1	20	.7	0.0	929
2 25 PCT T	290	.239	13.78	990	14.096	9934	14	342	126	.077	1.5	26	9.7	17.9	376
3 55 PCT T	520	.788	13.93	1112	14.777	14832	59	1597	905	.197	8.7	235	59.5	39.1	239
4 25 PCT T	200	.275	14.08	590	14.378	9707	15	375	132	.077	1.2	29	10.2	17.9	376
5 10 PCT T	220	.590	13.64	250	14.204	7711	14	592	99	.057	.8	34	2.8	7.2	992
6 25 PCT T	192	.251	13.93	530	14.203	9798	15	350	133	.077	1.2	27	10.2	17.9	376
7 90 PCT T	784	1.514	13.64	1659	15.299	20366	119	9087	809	.113	13.5	962	90.8	63.9	66
8 25 PCT T	188	.275	14.23	560	14.527	9707	14	371	136	.077	1.1	29	10.5	17.9	376
9 C.T.	20980	.337	8.81	29	11.368	1905	372	114	1	.193	53.2	16	.2	0.0	605
1 IDLE	1760	.928	11.98	59	12.109	1950	31	139	3	.232	7.3	32	.8	0.0	929
2 25 PCT T	364	.263	13.78	540	14.084	9843	29	371	137	.077	2.2	29	10.5	17.9	376
3 55 PCT T	616	.809	13.93	1159	14.809	14646	69	1613	917	.197	10.2	237	61.3	39.2	236
4 25 PCT T	260	.275	13.93	550	14.235	9707	20	379	136	.077	1.5	29	10.5	17.9	376
5 10 PCT T	260	.569	13.64	250	14.238	7666	16	618	99	.057	.9	35	2.8	7.2	992
6 25 PCT T	290	.275	13.93	560	14.232	9798	19	383	140	.077	1.9	29	10.8	17.9	376
7 90 PCT T	680	1.219	13.93	1723	15.227	20276	103	3279	832	.113	11.7	371	94.0	63.9	66
8 25 PCT T	220	.275	14.23	560	14.530	9707	17	371	136	.077	1.3	29	10.9	17.9	376
9 C.T.	20980	.337	8.92	23	10.971	1860	375	115	1	.193	53.7	17	.2	0.0	605

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CMP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1	I	16.9	0.0	0	9.3	R	R	.059	R	600	18.5	9.1	2.3	.9	5.2	0.0
2	25	19.8	29.0	63	21.9	.919	5.3	.063	.556	2000	15.8	1.7	3.0	5.8	8.8	7.3
3	55	9.2	52.5	138	32.7	.623	7.9	.067	.379	2000	15.0	9.8	26.7	30.6	25.2	30.5
4	25	19.8	23.9	63	21.9	.899	5.6	.065	.599	2000	15.5	1.3	3.3	5.2	8.6	7.3
5	10	17.9	9.7	25	17.0	1.755	5.2	.069	1.067	2000	15.6	.9	3.8	1.9	5.1	2.2
6	25	19.8	29.0	63	21.6	.901	5.6	.069	.598	2000	15.6	1.3	3.1	5.2	8.7	7.3
7	90	2.6	85.7	225	99.9	.529	9.6	.069	.319	2000	19.5	15.1	52.6	96.7	26.6	38.2
8	25	19.8	29.0	63	21.9	.892	5.8	.065	.593	2000	15.3	1.2	3.3	5.9	8.6	7.3
9	CT	23.8	0.0	0	9.2	R	R	.053	R	2000	18.7	59.6	1.9	.1	3.1	0.0
1	I	16.9	0.0	0	9.3	R	R	.055	R	600	18.1	8.1	9.0	.9	5.3	0.0
2	25	19.8	29.0	63	21.7	.905	5.8	.063	.550	2000	15.8	2.5	3.5	5.2	8.8	7.3
3	55	9.3	52.6	138	32.9	.616	8.1	.067	.375	2000	15.0	11.3	29.9	30.5	25.1	30.5
4	25	19.8	29.0	63	21.9	.892	5.8	.064	.593	2000	15.6	1.7	3.6	5.2	8.7	7.3
5	10	17.9	9.7	25	16.9	1.793	5.1	.069	1.060	2000	15.6	1.0	9.9	1.9	5.1	2.2
6	25	19.8	29.0	63	21.6	.901	6.0	.069	.593	2000	15.6	1.6	3.6	5.3	8.8	7.3
7	90	2.6	85.7	225	99.7	.521	9.9	.069	.317	2000	19.5	12.9	95.9	96.7	26.6	38.2
8	25	19.8	29.0	63	21.9	.892	5.8	.065	.593	2000	15.3	1.9	3.5	5.2	8.7	7.3
9	CT	23.8	0.0	0	9.1	R	R	.052	R	2000	19.9	59.5	2.0	.1	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 9.8 97 10.5

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 9.9 99 10.9

TWO CYCLE COMPOSITE -

HC- FID	0.35(9.8) + 0.65(9.9) =	9.852	G/KW HR	(3.618 BS)
CO- NDIR	0.35(97.9) + 0.65(93.6) =	94.920	G/KW HR	(33.997 BS)
NOX-CL	0.35(10.5) + 0.65(10.9) =	10.799	G/KW HR	(8.012 BS)
	HC + NOX =	15.596	G/KW HR	(11.630 BS)
	SFC =	.957	KG/KW HR	(.751 BS)

ID =

TABLE C-29. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-131 RUN-02 10-09-76 POST OVERHAUL BASELINE - CARBURETOR 6607 K= 1.090 HUM= 12.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1600	.350	11.99	55	12.518	1950	28	110	3	.232	6.9	26	.7	0.0	929
2 25 PCT T	298	.227	13.93	510	14.185	9939	20	322	123	.077	1.5	25	9.5	17.9	376
3 55 PCT T	512	.821	19.23	1088	15.110	19792	57	1619	366	.197	8.9	238	53.9	39.1	236
4 25 PCT T	216	.275	19.23	530	19.530	9798	17	375	123	.077	1.3	29	9.5	17.9	376
5 10 PCT T	290	.613	13.93	240	14.570	7711	14	655	99	.057	.8	37	2.6	7.2	992
6 25 PCT T	200	.251	19.23	550	19.509	9798	15	393	128	.077	1.2	26	9.9	17.9	376
7 90 PCT T	799	1.539	13.93	1615	15.559	20957	112	9088	733	.113	12.6	962	82.9	63.9	66
8 25 PCT T	172	.275	19.59	570	19.835	9707	13	369	129	.077	1.0	28	9.9	17.9	376
9 C.T.	20980	.337	9.01	23	11.572	1905	366	112	1	.193	52.9	16	.2	0.0	605
1 IDLE	1760	.969	11.99	60	12.655	1950	30	196	3	.232	7.0	39	.7	0.0	929
2 25 PCT T	348	.275	19.23	510	19.597	9798	28	379	119	.077	2.2	29	9.1	17.9	376
3 55 PCT T	690	.788	19.23	1183	15.090	19651	71	1595	397	.197	10.9	227	58.3	39.2	236
4 25 PCT T	260	.287	19.39	550	19.707	9707	19	383	125	.077	1.5	30	9.7	17.9	376
5 10 PCT T	290	.613	13.93	250	14.570	7711	19	655	96	.057	.8	37	2.6	7.2	992
6 25 PCT T	290	.275	19.23	590	19.532	9752	18	373	125	.077	1.9	29	9.6	17.9	376
7 90 PCT T	816	1.570	19.23	1637	15.899	20502	121	9091	729	.113	13.6	962	82.9	64.0	66
8 25 PCT T	216	.275	19.59	560	19.890	9662	16	362	126	.077	1.2	28	9.7	17.9	376
9 C.T.	18560	.325	9.22	23	11.564	1860	325	105	1	.193	96.9	15	.2	0.0	605

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- NV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1	I	16.9	0.0	0	9.3	R	R	.057	R	600	17.6	7.5	2.9	.9	5.2	0.0
2	25	19.8	23.9	63	21.9	.915	5.2	.069	.556	2000	15.7	1.8	2.8	5.3	8.8	7.3
3	55	9.3	52.5	138	32.5	.619	7.1	.068	.377	2000	14.7	9.8	26.8	30.1	25.0	30.5
4	25	19.8	23.9	63	21.6	.902	5.3	.065	.599	2000	15.3	1.5	3.3	5.3	8.7	7.3
5	10	17.5	9.7	25	17.0	1.755	9.6	.066	1.067	2000	15.2	1.0	9.2	1.9	5.1	2.2
6	25	19.8	29.0	63	21.6	.901	5.5	.065	.598	2000	15.3	1.9	3.0	5.5	8.7	7.3
7	90	2.6	85.7	225	95.1	.527	8.7	.070	.320	2000	19.2	19.8	52.1	96.3	26.7	38.2
8	25	19.8	29.0	63	21.9	.892	5.5	.067	.593	2000	15.0	1.2	3.2	5.5	8.6	7.3
9	CT	23.8	0.0	0	9.2	R	R	.059	R	2000	18.9	61.2	1.8	.1	3.1	0.0
1	I	16.9	0.0	0	9.3	R	R	.058	R	600	17.9	8.3	3.8	.9	5.2	0.0
2	25	19.8	29.0	63	21.6	.901	5.0	.065	.598	2000	15.3	2.6	3.2	5.0	8.7	7.3
3	55	9.3	52.6	138	32.3	.615	7.7	.068	.379	2000	14.7	12.3	25.5	32.0	25.0	30.5
4	25	19.8	29.0	63	21.9	.892	5.3	.066	.593	2000	15.1	1.8	3.3	5.3	8.7	7.3
5	10	17.4	9.7	25	17.0	1.752	9.8	.066	1.066	2000	15.2	1.0	9.2	1.9	5.1	2.2
6	25	19.8	29.0	63	21.5	.896	5.3	.065	.595	2000	15.3	1.7	3.2	5.3	8.7	7.3
7	90	2.6	85.8	225	95.2	.527	8.7	.072	.320	2000	13.9	16.1	51.9	95.2	26.9	38.2
8	25	19.8	29.0	63	21.3	.887	5.9	.067	.590	2000	15.0	1.5	3.1	5.3	8.6	7.3
9	CT	23.8	0.0	0	9.1	R	R	.059	R	2000	18.5	59.9	1.7	.1	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 9.6 98 9.7

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 9.6 98 9.8

TWO CYCLE COMPOSITE -

HC- FID 0.35(9.6) + 0.65(9.6) = 9.587 G/KW HR (3.920 BS)

CO- NDIR 0.35(97.9) + 0.65(98.1) = 98.006 G/KW HR (35.798 BS)

NOX-CL 0.35(9.7) + 0.65(9.8) = 9.777 G/KW HR (7.291 BS)

HC + NOX = 19.364 G/KW HR (10.711 BS)

SFC = .957 KG/KW HR (.751 BS)

ID =

TABLE C-30. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
ENGINE-1 TEST-131 RUN-03 10-09-76 POST OVERHAUL BASELINE - CARBURETOR 6607 K= 1.055 HUM= 13.6 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	2290	.275	11.98	59	12.009	1950	90	90	3	.232	9.9	21	.7	0.0	929
2 25 PCT T	280	.239	13.69	520	13.911	9888	22	393	130	.077	1.7	26	10.0	17.9	376
3 55 PCT T	600	.821	13.69	1158	19.529	19696	69	1678	907	.197	10.1	247	59.8	39.2	236
4 25 PCT T	229	.263	13.93	540	19.218	9752	17	365	138	.077	1.3	28	10.0	17.9	376
5 10 PCT T	290	.569	13.69	250	19.236	7756	15	626	98	.057	.8	36	2.7	7.2	992
6 25 PCT T	212	.263	13.93	540	19.217	9798	17	366	130	.077	1.3	28	10.0	17.9	376
7 90 PCT T	880	1.539	13.99	1637	15.129	20598	136	9222	779	.113	15.9	977	88.0	69.0	66
8 25 PCT T	200	.275	13.93	550	19.228	9707	15	379	131	.077	1.2	29	10.1	17.9	376
9 C.T.	29960	.350	3.62	23	11.673	1860	931	113	1	.193	61.6	16	.2	0.0	605
1 IDLE	1920	.376	11.98	59	12.069	1950	39	123	3	.232	8.0	28	.8	0.0	929
2 25 PCT T	900	.275	13.78	550	19.100	9798	31	386	134	.077	2.9	30	10.3	17.9	376
3 55 PCT T	696	.788	13.78	1207	19.697	19696	79	1596	929	.197	11.6	235	62.9	39.2	236
4 25 PCT T	292	.300	13.93	560	19.263	9752	23	919	139	.077	1.7	32	10.3	17.9	376
5 10 PCT T	260	.613	13.99	250	19.132	7711	16	676	98	.057	.9	39	2.7	7.2	992
6 25 PCT T	298	.263	13.69	550	13.931	9798	20	379	136	.077	1.5	29	10.9	17.9	376
7 90 PCT T	999	1.610	13.35	1637	15.067	20638	197	9955	786	.113	16.6	503	88.8	69.0	66
8 25 PCT T	228	.312	19.08	570	19.918	9752	17	926	135	.077	1.3	33	10.9	17.9	376
9 C.T.	29960	.350	8.92	29	11.968	1905	998	117	1	.193	69.1	17	.2	0.0	605

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I		16.9	0.0	0	9.3	R	R	.055	R	600	18.3	9.1	2.3	.9	5.2	0.0
2 25		19.8	29.0	63	21.8	.909	5.5	.063	.553	2000	16.0	1.7	2.9	5.2	8.8	7.3
3 55		9.3	52.6	138	32.9	.616	7.9	.066	.375	2000	15.2	9.8	27.2	31.2	25.0	30.5
4 25		19.8	29.0	63	21.5	.896	5.5	.069	.545	2000	15.6	1.3	3.1	5.2	8.7	7.3
5 10		17.9	9.7	25	17.1	1.762	5.0	.069	1.072	2000	15.6	.8	3.9	1.9	5.1	2.2
6 25		19.8	29.0	63	21.6	.900	5.5	.069	.547	2000	15.6	1.2	3.1	5.2	8.7	7.3
7 90		2.6	85.8	225	95.3	.528	9.3	.069	.321	2000	19.6	15.0	52.5	95.9	26.8	38.2
8 25		19.8	29.0	63	21.9	.891	5.6	.069	.542	2000	15.6	1.2	3.2	5.3	8.6	7.3
9 CT		23.8	0.0	0	9.1	R	R	.055	R	2000	18.1	59.9	1.8	.1	3.1	0.0
1 I		16.9	0.0	0	9.3	R	R	.055	R	600	18.2	7.9	3.0	.9	5.2	0.0
2 25		19.8	29.0	63	21.6	.900	5.7	.069	.547	2000	15.7	2.2	3.1	5.3	8.7	7.3
3 55		9.3	52.6	138	32.9	.616	8.2	.066	.375	2000	15.1	10.8	29.8	31.8	29.9	30.5
4 25		19.8	29.0	63	21.5	.896	5.7	.069	.545	2000	15.6	1.6	3.9	5.3	8.7	7.3
5 10		17.9	9.7	25	17.0	1.752	5.0	.069	1.066	2000	15.7	.8	9.1	1.9	5.1	2.2
6 25		19.8	29.0	63	21.6	.900	5.8	.063	.547	2000	15.9	1.9	3.0	5.3	8.7	7.3
7 90		2.6	85.8	225	95.5	.520	9.9	.068	.323	2000	19.6	15.9	53.3	95.2	26.9	38.2
8 25		19.8	29.0	63	21.5	.896	5.7	.065	.545	2000	15.9	1.2	3.5	5.3	8.7	7.3
9 CT		23.8	0.0	0	9.2	R	R	.059	R	2000	18.9	59.2	1.8	.1	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 5.6 99 10.3
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 5.8 51 10.6

TWO CYCLE COMPOSITE -

HC- FID	0.35(5.6) + 0.65(5.8) =	5.743	G/KW HR	(9.282 BS)
CO- NDIR	0.35(99.0) + 0.65(51.0) =	50.321	G/KW HR	(37.525 BS)
NOX-CL	0.35(10.3) + 0.65(10.6) =	10.509	G/KW HR	(7.836 BS)
	HC + NOX =	16.252	G/KW HR	(12.119 BS)
	.SFC =	.958	KG/KW HR	(.753 BS)

ID =

TABLE C-31. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-131 RUN-HOT 10-09-76 POST OVERHAUL BASELINE - CARBURETOR 6607 K= 1.069 HUM= 14.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKH	VAC. MM
1	2000	1600	5.710	11.12	1088	17.015	25769	280	17965	597	280.0	17965	589.9	70.8	13
2	2000	1600	5.890	11.00	1088	17.025	25719	279	17821	596	279.4	17821	583.5	70.5	13
3	2000	1600	5.890	11.24	1082	17.265	25992	279	17918	593	273.6	17918	570.3	70.5	13

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1		.5	99.9	299	56.8	3.01	187.80	5.88	.568	12.5	.080	9.04	571.84	7.89	.364
2		.5	99.5	298	56.7	3.02	192.66	5.90	.600	12.5	.080	9.05	587.36	7.91	.365
3		.5	99.6	298	56.2	2.96	188.30	5.77	.599	12.3	.081	8.97	572.51	7.73	.361

ID =

TABLE C-32. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-? TEST-213 RUN-01 PORT LINERS NO AIR 06-01-76 K= 1.109 HUM= 18.6 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1180	.209	13.49	77	13.827	2091	20	61	9	.232	9.6	14	1.0	0.0	934
2 25 PCT T	250	.227	14.23	570	15.486	10251	20	325	149	.077	1.5	25	11.9	17.7	366
3 55 PCT T	690	.415	14.59	1323	15.028	19696	71	820	476	.147	10.5	121	70.0	39.1	236
4 25 PCT T	220	.251	14.59	600	14.816	10115	17	346	151	.077	1.3	27	11.6	18.2	373
5 10 PCT T	220	.598	13.93	250	14.553	7938	14	659	50	.057	.8	38	2.9	7.3	992
6 25 PCT T	140	.227	14.08	590	14.326	10342	13	332	157	.077	1.0	26	12.1	18.1	366
7 90 PCT T	1020	1.117	14.23	1828	15.963	20725	154	3030	909	.113	17.7	342	102.2	65.0	61
8 25 PCT T	180	.312	14.59	590	14.872	10070	14	427	147	.077	1.1	33	11.3	17.6	373
9 C.T.	22400	.992	10.07	29	12.970	2041	387	140	1	.143	55.3	20	.2	0.0	638
1 IDLE	880	.209	13.64	39	13.993	2132	15	63	9	.232	3.5	15	1.0	0.0	992
2 25 PCT T	280	.251	14.39	540	14.673	10251	22	354	144	.077	1.7	27	11.1	17.6	368
3 55 PCT T	620	.428	14.59	1323	15.039	19832	70	853	480	.147	10.2	125	70.6	39.0	236
4 25 PCT T	200	.251	14.59	590	14.816	10070	15	345	148	.077	1.2	27	11.4	18.2	373
5 10 PCT T	180	.540	13.93	230	14.490	7711	11	580	45	.057	.6	33	2.6	6.8	994
6 25 PCT T	140	.227	14.23	590	14.473	10206	11	329	153	.077	.9	25	11.8	18.2	368
7 90 PCT T	700	.598	13.93	1969	14.608	20457	111	1692	1015	.113	12.6	191	114.7	65.9	61
8 25 PCT T	140	.239	14.23	610	14.985	10024	11	339	155	.077	.8	26	12.0	18.0	366
9 C.T.	23680	.928	8.62	23	11.619	2132	971	159	2	.143	67.9	23	.2	0.0	610

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.1	0.0	0	9.5	R	R	.042	R	600	16.0	9.4	2.2	.9	5.3	0.0
2 25 PCT T	19.9	23.7	63	22.6	.953	6.9	.065	.580	1970	15.9	1.6	3.9	5.1	8.9	7.2
3 55 PCT T	9.3	52.9	138	32.9	.618	9.2	.068	.376	1990	19.8	11.2	18.7	31.9	29.9	30.2
4 25 PCT T	19.7	29.4	65	22.3	.913	6.3	.066	.555	1970	15.0	1.9	4.1	5.2	8.8	7.9
5 10 PCT T	17.9	9.8	26	17.5	1.782	5.2	.066	1.084	1950	15.2	.8	5.8	1.3	5.1	2.2
6 25 PCT T	19.9	29.3	65	22.8	.938	6.6	.069	.571	1960	15.5	1.1	4.0	5.9	9.0	7.3
7 90 PCT T	2.9	87.2	228	95.9	.525	10.5	.070	.319	2010	19.3	18.9	53.1	95.9	26.5	38.6
8 25 PCT T	19.7	23.5	63	22.2	.993	6.9	.067	.574	1960	15.0	1.1	5.1	5.1	8.7	7.1
9 C.T.	25.1	0.0	0	9.5	R	R	.061	R	1980	16.9	59.0	9.1	.1	3.3	0.0
1 IDLE	17.9	0.0	0	9.7	R	R	.063	R	600	15.9	3.6	3.0	.9	5.6	0.0
2 25 PCT T	19.5	23.4	63	22.6	.956	6.2	.066	.582	1970	15.2	1.7	5.6	9.7	8.9	7.1
3 55 PCT T	9.3	52.3	138	32.7	.625	9.3	.068	.380	1990	19.8	10.3	25.5	30.0	29.6	30.0
4 25 PCT T	19.7	29.4	65	22.2	.910	6.2	.066	.553	1970	15.0	1.2	5.9	9.8	8.8	7.3
5 10 PCT T	17.5	9.1	24	17.0	1.877	5.1	.065	1.142	1950	15.3	.6	6.7	1.1	5.0	2.0
6 25 PCT T	19.5	29.4	65	22.5	.921	6.9	.065	.560	1970	15.9	.9	5.1	5.0	8.9	7.3
7 90 PCT T	2.9	88.9	230	95.1	.510	11.7	.066	.310	2020	15.2	12.7	38.9	98.7	26.1	39.0
8 25 PCT T	19.9	29.2	65	22.1	.919	6.5	.065	.556	1950	15.9	.9	5.2	5.1	8.7	7.3
9 C.T.	29.0	0.0	0	9.7	R	R	.055	R	1970	18.2	68.1	9.6	.1	3.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 5.0 34 11.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 5.3 26 12.5

TWO CYCLE COMPOSITE -

HC- FID	0.35(5.0) + 0.65(5.3) =	5.173	G/KW	HR	(3.857 BS)
CO- NDIR	0.35(34.5) + 0.65(26.1) =	29.058	G/KW	HR	(21.669 BS)
NOX-CL	0.35(11.9) + 0.65(12.5) =	12.305	G/KW	HR	(9.176 BS)
	HC + NOX =	17.478	G/KW	HR	(13.033 BS)
	SFC =	.949	KG/KW	HR	(.763 BS)

TABLE C-33. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-2 TEST-213 RUN-02 PORT LINERS HD AIR 06-01-76 K= 1.113 HUM= 19.6 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	840	.198	13.35	65	13.693	2091	19	60	9	.232	3.3	19	.8	0.0	934
2 25 PCT T	260	.209	14.08	550	14.319	10297	21	297	196	.077	1.6	23	11.3	17.6	363
3 55 PCT T	620	.415	14.23	1277	14.715	19696	70	837	971	.197	10.3	123	69.3	39.2	236
4 25 PCT T	200	.239	14.39	600	14.652	10251	16	338	155	.077	1.2	26	11.9	17.6	363
5 10 PCT T	200	.569	13.69	230	14.231	7754	12	626	96	.057	.7	36	2.6	6.2	934
6 25 PCT T	160	.216	14.23	580	14.464	10206	13	307	151	.077	1.0	24	11.6	17.5	366
7 90 PCT T	790	.613	14.23	1999	14.927	20598	116	1705	992	.113	13.1	193	112.1	65.0	61
8 25 PCT T	150	.225	14.39	580	14.682	10029	12	380	146	.077	.9	29	11.3	17.5	363
9 C.T.	23680	.956	9.96	20	12.910	2087	919	199	1	.193	60.0	21	.2	0.0	602
1 IDLE	1100	.2	13.69	67	14.003	2087	18	72	9	.232	4.3	17	.9	0.0	934
2 25 PCT T	340	.251	14.39	570	14.682	10297	29	356	198	.077	2.2	27	11.9	17.7	363
3 55 PCT T	680	.928	14.59	1300	15.096	19560	75	837	965	.197	11.0	123	68.9	38.5	241
4 25 PCT T	260	.300	14.39	580	14.719	10070	20	919	147	.077	1.6	32	11.3	18.2	363
5 10 PCT T	200	.997	14.08	225	14.600	7620	12	529	93	.057	.7	30	2.5	6.2	939
6 25 PCT T	200	.227	14.39	590	14.690	10206	16	320	152	.077	1.2	25	11.7	18.2	363
7 90 PCT T	1000	1.038	14.39	1869	15.592	20502	151	2766	911	.113	17.0	313	103.0	65.9	61
8 25 PCT T	180	.275	14.39	570	14.686	10029	14	379	199	.077	1.1	29	11.1	18.1	366
9 C.T.	22900	.992	9.69	19	12.531	2132	917	152	1	.193	59.6	22	.2	0.0	602

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.1	0.0	0	9.5	R	R	.062	R	600	16.2	3.6	2.8	.9	5.9	0.0
2 25 PCT T	19.3	23.6	63	22.7	.962	6.3	.069	.585	1970	15.5	1.8	4.7	4.9	9.0	7.2
3 55 PCT T	9.3	52.5	138	32.9	.617	9.1	.066	.375	2000	15.1	11.2	25.2	30.0	29.9	30.5
4 25 PCT T	19.3	23.6	63	22.6	.958	6.7	.066	.583	1970	15.2	1.3	5.3	5.2	8.9	7.2
5 10 PCT T	17.1	8.3	22	17.1	2.072	5.7	.069	1.260	1990	15.6	.8	7.3	1.1	5.0	1.9
6 25 PCT T	19.9	23.5	63	22.5	.958	6.5	.065	.582	1960	15.9	1.1	4.8	5.0	8.9	7.2
7 90 PCT T	2.9	87.1	228	95.3	.520	11.6	.067	.316	2010	19.9	19.2	39.9	98.5	26.3	38.9
8 25 PCT T	19.9	23.5	63	22.1	.990	6.3	.066	.572	1960	15.2	1.0	6.0	4.9	8.7	7.2
9 C.T.	23.7	0.0	0	9.6	R	R	.061	R	1980	16.5	66.1	9.9	.1	3.9	0.0
1 IDLE	17.1	0.0	0	9.6	R	R	.063	R	600	15.8	9.3	2.7	.9	5.5	0.0
2 25 PCT T	19.3	23.8	63	22.7	.955	6.7	.066	.581	1980	15.2	2.2	4.9	5.2	9.0	7.2
3 55 PCT T	9.9	51.4	136	32.1	.622	9.2	.068	.378	1990	14.8	11.9	19.9	31.0	29.3	29.7
4 25 PCT T	19.3	29.9	65	22.2	.910	6.1	.066	.553	1970	15.1	1.6	5.2	5.1	8.8	7.9
5 10 PCT T	17.3	8.3	22	16.8	2.023	5.3	.066	1.231	1950	15.2	.7	9.8	1.1	9.9	1.9
6 25 PCT T	19.3	29.9	65	22.5	.921	6.3	.066	.560	1970	15.2	1.2	9.0	5.3	8.9	7.9
7 90 PCT T	2.9	88.9	230	95.2	.511	10.5	.070	.311	2020	19.3	17.3	50.7	96.7	26.3	39.2
8 25 PCT T	19.9	29.3	65	22.1	.909	6.0	.066	.553	1960	15.2	1.1	9.7	5.0	8.8	7.3
9 C.T.	23.7	0.0	0	9.7	R	R	.059	R	1990	17.0	60.9	3.5	.1	3.5	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------			5.0	26	12.9
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------			5.3	33	11.8
TWO CYCLE COMPOSITE -	HC- FID 0.35(5.0) + 0.65(5.3) =	5.163	G/KW HR	(3.850 BS)	
	CO- NDIR 0.35(26.3) + 0.65(33.0) =	30.693	G/KW HR	(22.851 BS)	
	NOX-CL 0.35(12.9) + 0.65(11.8) =	12.009	G/KW HR	(8.955 BS)	
	HC + NOX =	17.172	G/KW HR	(12.805 BS)	
	SFC =	.965	KG/KW HR	(.769 BS)	

TABLE C-34. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
ENGINE-02 TEST-213 RUN-03 PORT LINERS W AIR 04-01-76 K= 1.107 HUM= 10.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED HC	G/HR CO	NOX	WT. FACT.	WEIGHTED HC-FID	G/HR CO	NOX-CL	CKW	VAC. MM
1 IDLE	890	.125	9.93	39	9.697	1996	19	52	3	.232	9.9	12	.7	0.0	939
2 25 PCT T	160	.115	11.00	390	11.132	10392	14	215	133	.077	1.3	17	10.3	17.8	366
3 55 PCT T	190	.209	12.25	1040	12.979	15019	29	496	960	.197	3.6	73	67.7	38.6	236
4 25 PCT T	90	.109	11.29	920	11.359	10160	9	197	138	.077	.7	15	10.6	18.9	368
5 10 PCT T	50	.109	10.53	160	10.695	7756	9	161	93	.057	.2	9	2.9	6.3	999
6 25 PCT T	90	.109	11.29	900	11.353	10160	8	187	132	.077	.6	19	10.1	17.8	368
7 90 PCT T	95	.376	13.21	1527	13.596	20502	16	1199	897	.113	1.8	129	95.7	65.9	61
8 25 PCT T	50	.098	11.36	930	11.466	10029	5	179	130	.077	.9	13	10.6	17.6	366
9 C.T.	99800	.197	1.97	11	6.685	1950	1333	87	1	.193	190.6	12	.2	0.0	612
1 IDLE	1200	.131	9.93	37	9.692	1996	27	59	3	.232	6.2	13	.6	0.0	950
2 25 PCT T	360	.136	11.29	910	11.916	10297	36	249	136	.077	2.8	19	10.5	17.8	366
3 55 PCT T	300	.181	12.12	1016	12.335	19651	90	435	999	.197	5.8	69	65.2	38.7	239
4 25 PCT T	180	.109	11.29	930	11.369	10115	18	186	191	.077	1.9	19	10.8	18.3	366
5 10 PCT T	130	.098	10.91	120	10.523	7989	10	191	31	.057	.6	8	1.8	6.2	950
6 25 PCT T	190	.109	11.29	900	11.359	10206	19	188	132	.077	1.1	19	10.2	17.8	366
7 90 PCT T	120	.992	13.69	1392	19.095	20775	20	1315	759	.113	2.3	199	85.2	65.7	61
8 25 PCT T	90	.098	11.36	920	11.468	9893	9	179	133	.077	.7	13	10.2	17.6	373
9 C.T.	98000	.109	1.50	8	6.975	1905	1933	62	1	.193	205.0	9	.1	0.0	617

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.1	0.0	0	9.9	R	R	.099	R	600	22.6	2.2	9.1	.3	5.2	0.0
2 25 PCT T	19.9	23.8	43	22.8	.956	5.7	.051	.582	1990	19.7	.6	5.6	9.9	9.0	7.2
3 55 PCT T	9.3	51.8	136	33.1	.639	9.0	.057	.389	2000	17.7	1.7	29.7	32.5	25.0	29.9
4 25 PCT T	19.5	29.6	45	22.9	.909	5.7	.052	.553	1990	19.9	.3	5.1	5.1	8.8	7.9
5 10 PCT T	17.5	8.9	22	17.1	2.038	5.2	.099	1.240	1970	20.6	.1	9.1	1.2	5.0	1.9
6 25 PCT T	19.5	23.9	43	22.9	.938	5.6	.052	.570	1990	19.9	.3	9.9	9.9	8.8	7.2
7 90 PCT T	2.9	88.9	230	95.2	.511	9.7	.061	.311	2020	16.3	.9	93.7	95.9	26.2	39.2
8 25 PCT T	19.9	23.7	43	22.1	.934	5.9	.052	.568	1970	19.2	.2	9.5	5.1	8.7	7.2
9 C.T.	29.1	0.0	0	9.3	R	R	.033	R	1970	30.1	93.7	9.2	.1	3.2	0.0
1 IDLE	17.7	0.0	0	9.9	R	R	.099	R	600	22.5	2.8	9.2	.3	5.3	0.0
2 25 PCT T	19.9	23.9	43	22.7	.949	5.8	.052	.577	1990	19.3	1.2	6.3	5.9	9.0	7.2
3 55 PCT T	9.9	51.9	136	32.3	.622	8.7	.056	.378	2000	17.9	2.6	21.1	33.5	24.5	30.0
4 25 PCT T	19.9	29.6	45	22.3	.908	5.8	.052	.552	1980	19.3	.6	9.7	5.6	8.9	7.9
5 10 PCT T	17.7	8.3	22	16.5	1.985	3.8	.099	1.207	1950	20.8	.3	2.7	.9	9.9	1.9
6 25 PCT T	19.9	23.9	43	22.5	.940	5.6	.052	.572	1990	19.9	.5	9.8	5.2	9.0	7.2
7 90 PCT T	2.9	88.1	230	95.8	.520	8.7	.069	.316	2010	15.7	1.0	99.0	93.8	26.7	39.1
8 25 PCT T	19.7	23.6	43	21.7	.921	5.7	.052	.560	1960	19.2	.3	9.3	5.2	8.6	7.1
9 C.T.	29.3	0.0	0	9.2	R	R	.032	R	2000	31.0	90.8	2.9	.1	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 10.9 16 11.1
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 12.1 16 10.9

TWO CYCLE COMPOSITE -

HC- FID	0.35(10.9) + 0.65(12.1) =	11.681	G/KW	HR	(8.710	BS)
CO- NDIR	0.35(15.8) + 0.65(16.3) =	16.102	G/KW	HR	(12.007	BS)
NOX-CL	0.35(11.1) + 0.65(10.9) =	10.989	G/KW	HR	(7.971	BS)
	HC + NOX =	22.370	G/KW	HR	(16.681	BS)
	SFC =	.949	KG/KW	HR	(.762	BS)

TABLE C-35. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-? TEST-213 RUN-09 LINERS W AIR X-CT 06-01-76 K= 1.111 HUM= 19.0 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1190	.109	9.32	93	9.598	1905	25	92	3	.232	5.7	10	.7	0.0	927
2 25 PCT T	170	.170	11.29	390	11.929	10387	17	312	131	.077	1.3	24	10.1	18.1	366
3 55 PCT T	190	.233	12.38	1028	12.635	14923	25	557	998	.147	3.7	82	65.8	39.3	236
4 25 PCT T	80	.125	11.36	390	11.494	10160	8	229	127	.077	.6	17	9.8	18.0	366
5 10 PCT T	50	.115	10.76	155	10.880	7847	4	167	91	.057	.2	10	2.9	7.0	992
6 25 PCT T	70	.120	11.34	400	11.482	10342	.7	218	133	.077	.5	17	10.2	18.1	366
7 90 PCT T	120	.251	13.21	1637	13.475	20548	21	773	921	.113	2.3	87	104.1	65.8	61
8 25 PCT T	35	.109	11.34	968	11.468	10115	3	185	315	.077	.3	14	24.3	18.0	366
9 C.T.	15340	.363	9.93	26	11.968	1819	265	116	2	.143	37.9	17	.2	0.0	615
1 IDLE	760	.125	9.53	93	9.738	1860	16	98	3	.232	3.7	11	.7	0.0	992
2 25 PCT T	190	.197	11.29	380	11.909	10392	19	270	127	.077	1.5	21	9.8	18.0	366
3 55 PCT T	170	.209	12.52	1016	12.743	15019	22	986	992	.147	3.3	71	64.9	39.6	239
4 25 PCT T	95	.120	11.36	390	11.490	10160	9	219	127	.077	.7	16	9.8	17.9	366
5 10 PCT T	45	.115	11.36	365	11.482	8029	5	162	99	.057	.3	9	5.9	7.5	371
6 25 PCT T	90	.120	11.36	365	11.489	10160	8	219	119	.077	.6	16	9.2	18.0	371
7 90 PCT T	115	.343	13.49	1527	13.866	20729	19	1095	892	.113	2.2	124	95.2	65.8	61
8 25 PCT T	95	.109	11.48	365	11.589	10029	9	181	116	.077	.3	14	9.0	17.9	371
9 C.T.	14000	.376	9.93	25	11.551	1819	279	119	1	.143	39.2	17	.2	0.0	610

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	16.8	0.0	0	9.2	R	R	.044	R	600	22.8	10.9	3.5	.3	5.0	0.0
2 25 PCT T	19.9	29.3	64	22.9	.994	5.4	.052	.574	1990	19.2	2.5	8.7	4.9	9.1	7.3
3 55 PCT T	9.3	52.7	138	32.9	.625	8.7	.057	.380	2010	17.5	7.0	29.5	28.9	29.9	30.1
4 25 PCT T	19.9	29.2	64	22.9	.926	5.4	.052	.563	2000	19.1	1.1	6.2	9.3	8.9	7.2
5 10 PCT T	17.9	9.3	25	17.3	1.856	9.5	.050	1.129	1990	20.2	.9	3.9	1.0	5.1	2.1
6 25 PCT T	19.9	29.3	63	22.8	.938	5.6	.052	.571	2010	19.1	1.0	4.1	9.5	9.0	7.3
7 90 PCT T	2.9	88.2	227	95.3	.513	10.7	.061	.312	2090	16.9	9.9	31.5	95.7	26.3	38.8
8 25 PCT T	19.9	29.2	64	22.3	.921	13.3	.052	.561	2000	19.2	.5	5.1	10.7	8.8	7.2
9 C.T.	29.2	0.0	0	9.0	R	R	.053	R	2010	18.7	72.1	6.0	.1	2.9	0.0
1 IDLE	17.9	0.0	0	9.1	R	R	.045	R	600	22.9	7.1	3.7	.3	9.9	0.0
2 25 PCT T	19.9	29.2	64	22.8	.992	5.9	.052	.573	2000	19.3	2.8	4.9	9.8	9.0	7.2
3 55 PCT T	9.2	53.0	137	33.1	.624	8.5	.058	.380	2030	17.3	6.9	23.8	31.8	25.0	30.3
4 25 PCT T	19.9	29.1	63	22.9	.931	5.9	.052	.566	1990	19.1	1.9	5.5	9.8	8.9	7.2
5 10 PCT T	19.6	10.1	27	17.7	1.753	9.6	.052	1.066	1990	19.2	.6	3.1	2.6	5.2	2.2
6 25 PCT T	19.6	29.2	64	22.9	.926	5.0	.052	.563	2000	19.1	1.2	5.5	9.5	8.9	7.2
7 90 PCT T	2.9	88.2	229	95.7	.518	9.8	.063	.315	2020	16.0	9.2	91.2	96.6	26.5	38.7
8 25 PCT T	19.6	29.1	63	22.1	.919	5.0	.053	.559	1990	19.0	.6	9.6	9.9	8.7	7.2
9 C.T.	29.0	0.0	0	9.0	R	R	.059	R	2000	18.6	75.7	5.7	.1	2.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 2.8 15 12.2

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 2.8 16 10.9

TWO CYCLE COMPOSITE -

HC- FID 0.35(2.8) + 0.65(2.8) = 2.777 G/KW HR (2.071 BS)

CO- NDIR 0.35(14.8) + 0.65(14.0) = 15.595 G/KW HR (11.629 BS)

NOX-CL 0.35(12.2) + 0.65(10.9) = 11.328 G/KW HR (8.447 BS)

HC + NOX = 14.105 G/KW HR (10.518 BS)

SFC = .960 KG/KW HR (.756 BS)

TABLE C-36. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-2 TEST-213 RUN-#01 06-01-76 PORT LINERS

K= 1.109 HUM= 18.4 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2010	1990	5.710	11.12	724	17.059	26990	398	17916	373	398.2	17916	919.1	72.0	15
2	2020	1960	5.710	11.24	770	17.177	26717	353	17990	398	352.7	17990	991.0	72.9	15
3	2000	320	2.500	13.69	580	16.177	26082	59	8192	310	59.3	8192	399.3	71.8	15
4	2010	280	2.670	13.69	550	16.342	26172	52	8638	292	51.6	8638	329.3	72.4	15

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	CALC F/A	G/KW HR HC	CO	NOx	SFC KG/KW HR
1		.6	96.5	252	58.9	3.67	188.76	3.93	.605	12.5	.080	4.92	253.13	5.28	.368
2		.6	97.1	252	58.9	3.70	188.08	4.17	.607	12.4	.081	4.96	252.22	5.59	.369
3		.6	96.2	253	57.5	.63	86.21	3.29	.598	13.6	.074	.84	115.61	4.41	.363
4		.6	97.3	254	57.7	.59	91.01	3.08	.593	13.4	.074	.79	122.09	4.13	.361

ID =

TABLE C-37. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-0311

ENGINE-2 TEST-219 RUN-2 DR-03-76 MOD. 8L-PORTED IN+EX MAN-CARB 6606-HEINOVA K= 1.091 HUM= 16.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1760	.390	12.25	47	12.786	1860	29	100	2	.232	6.6	23	.6	0.0	457
2 25 PCT T	276	.280	13.78	490	14.041	9435	21	329	119	.077	1.6	29	9.2	17.3	389
3 55 PCT T	536	.430	13.49	1125	14.181	19792	63	1323	929	.197	9.3	1[illegible]	62.[illegible]	39.7	229
4 25 PCT T	220	.300	13.78	550	14.105	9389	17	903	133	.077	1.3	31	10.2	17.9	389
5 10 PCT T	132	.390	13.49	256	13.845	7303	8	362	98	.057	.9	21	2.7	7.9	997
6 25 PCT T	180	.290	13.78	520	14.090	9389	14	390	126	.077	1.0	30	9.7	17.9	389
7 90 PCT T	992	1.720	13.35	1650	15.183	20689	159	9733	819	.113	17.9	535	92.0	65.9	63
8 25 PCT T	172	.390	13.93	510	14.289	9399	13	999	121	.077	1.0	35	9.3	17.9	389
9 C.T.	33920	.670	7.68	24	12.009	2091	621	230	1	.193	88.9	33	.2	0.0	599
1 IDLE	1216	.530	13.07	62	13.737	1860	19	195	3	.232	9.3	39	.7	0.0	457
2 25 PCT T	360	.390	13.78	980	14.161	9389	27	955	115	.077	2.1	35	8.9	17.9	389
3 55 PCT T	560	.660	13.69	1150	14.963	19787	65	1373	929	.197	9.6	202	63.0	90.1	226
4 25 PCT T	299	.390	13.79	590	14.198	9253	18	999	128	.077	1.9	35	9.9	17.8	389
5 10 PCT T	198	.360	13.35	270	13.727	7398	9	389	52	.057	.5	22	3.0	7.5	997
6 25 PCT T	216	.390	13.93	530	14.299	9389	16	951	126	.077	1.2	35	9.7	17.9	389
7 90 PCT T	928	1.790	13.35	1625	15.296	21097	196	9992	813	.113	16.5	569	91.8	66.6	63
8 25 PCT T	172	.390	13.93	560	14.289	9253	13	995	131	.077	1.0	39	10.1	17.8	389
9 C.T.	25600	.630	8.23	22	11.630	2087	597	228	1	.193	71.1	33	.2	0.0	732

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	16.0	0.0	0	4.1	R	R	.058	R	600	17.2	5.2	2.5	.3	5.1	0.0
2 25 PCT T	15.3	23.1	61	20.8	.899	5.2	.063	.597	2000	15.8	1.3	3.1	9.7	8.5	6.9
3 55 PCT T	9.0	53.2	140	32.5	.610	8.1	.069	.371	2000	15.6	7.3	20.9	31.8	25.9	30.9
4 25 PCT T	15.3	23.9	63	20.7	.865	5.6	.069	.526	2000	15.7	1.8	3.3	5.2	8.5	7.2
5 10 PCT T	17.6	9.9	26	16.1	1.618	9.9	.062	.984	1980	16.0	.9	2.2	1.9	9.9	2.2
6 25 PCT T	15.3	24.0	63	20.7	.863	5.3	.063	.525	2000	15.8	.8	3.2	9.9	8.5	7.2
7 90 PCT T	2.5	88.9	230	45.6	.516	9.9	.069	.319	2020	19.5	13.6	57.5	96.9	27.9	38.9
8 25 PCT T	15.3	24.0	63	20.6	.857	5.3	.069	.522	2000	15.5	.8	3.7	9.7	8.9	7.2
9 C.T.	23.6	0.0	0	9.5	R	R	.058	R	2000	17.9	69.7	3.5	.1	3.9	0.0
1 IDLE	16.0	0.0	0	9.1	0	R	.062	R	680	16.1	9.0	3.9	.9	5.0	0.0
2 25 PCT T	15.3	24.0	63	20.7	.862	9.9	.069	.529	2000	15.7	1.9	3.5	9.5	8.9	7.1
3 55 PCT T	8.9	53.2	140	32.6	.607	8.1	.065	.369	2010	15.9	8.9	20.3	32.0	25.9	30.9
4 25 PCT T	15.3	23.9	63	20.9	.853	5.9	.069	.519	1990	15.7	1.3	3.5	5.0	8.3	7.1
5 10 PCT T	17.6	10.1	26	16.2	1.608	9.3	.062	.978	2000	16.1	.5	2.2	1.5	9.9	2.2
6 25 PCT T	15.3	24.0	63	20.7	.862	5.3	.069	.529	2000	15.5	1.1	3.5	9.9	8.9	7.1
7 90 PCT T	2.5	89.3	230	46.9	.519	9.3	.069	.316	2040	19.9	15.3	56.8	96.5	27.7	38.9
8 25 PCT T	15.4	23.9	63	20.9	.857	5.6	.069	.519	1990	15.5	.9	3.9	9.1	8.3	7.1
9 C.T.	28.8	0.0	0	9.6	R	R	.055	R	2000	18.1	66.0	3.3	.1	3.5	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 6.8 99 10.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 5.7 52 10.9

TWO CYCLE COMPOSITE -

HC= FID	0.35(6.8) + 0.65(5.7) =	6.093	G/KW HR	(9.506	88)
CO= NDIR	0.35(99.3) + 0.65(52.2) =	51.196	G/KW HR	(38.177	85)
NOx-CL	0.35(10.9) + 0.65(10.4) =	10.381	G/KW HR	(7.791	85)
	HC + NOX =	16.929	G/KW HR	(12.297	88)
	SFC =	.999	KG/KW HR	(.730	85)

TABLE C-38. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
ENGINE-2 TEST-219 RUN-3 08-03-76 WITH VAC ADV - ALL OTHER SAME AS RUN 2 K= 1.085 HUM= 15.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1856	.390	12.25	96	12.292	1678	27	90	2	.232	6.3	21	.5	0.0	957
2 25 PCT T	752	.550	13.35	1050	13.985	7938	98	631	215	.077	3.7	49	16.5	17.9	932
3 55 PCT T	1040	.530	13.69	2550	14.268	12383	102	928	796	.147	15.0	136	117.0	90.1	287
4 25 PCT T	672	.690	13.35	1050	14.066	7802	92	717	210	.077	3.2	55	16.2	17.9	932
5 10 PCT T	248	.190	12.79	350	13.008	5529	12	165	54	.057	.7	9	3.1	7.5	990
6 25 PCT T	688	.690	13.35	1050	14.068	7847	93	721	211	.077	3.3	56	16.2	17.9	932
7 90 PCT T	800	1.290	13.69	1700	14.971	20185	123	3377	826	.113	13.9	382	93.3	65.8	66
8 25 PCT T	690	.690	13.35	1100	14.062	7711	90	709	217	.077	3.1	55	16.7	17.9	932
9 C.T.	332R0	.350	7.32	22	11.239	1905	609	120	1	.193	86.9	17	.2	0.0	605
1 IDLE	1656	.960	12.52	55	13.188	1905	30	139	3	.232	7.0	31	.7	0.0	955
2 25 PCT T	700	.600	13.35	1100	14.029	7943	95	690	225	.077	3.5	53	17.9	18.1	932
3 55 PCT T	1090	.530	13.69	2600	14.288	12979	103	935	818	.147	15.1	137	120.2	90.0	287
4 25 PCT T	720	.640	13.35	1075	14.071	7756	95	713	213	.077	3.5	55	16.9	18.0	932
5 10 PCT T	248	.190	12.79	355	13.012	5715	19	169	56	.057	.8	10	3.2	6.9	990
6 25 PCT T	688	.610	13.35	1050	14.038	7756	93	681	209	.077	3.3	52	16.1	17.8	932
7 90 PCT T	1656	1.930	13.99	1725	15.131	20230	282	3842	831	.113	31.9	936	93.9	66.5	66
8 25 PCT T	624	.610	13.35	1100	14.030	7666	38	673	217	.077	3.0	52	16.7	18.9	934
9 C.T.	32690	.390	7.15	22	10.980	1905	606	119	1	.193	86.6	17	.2	0.0	605

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 IDLE	18.0	0.0	0	3.7	R	R	.058	R	600	17.2	9.6	2.7	.2	5.2	0.0
2 25 PCT T	17.0	29.1	63	17.5	.727	9.1	.063	.992	2000	15.8	2.7	6.2	5.9	8.2	7.2
3 55 PCT T	11.3	53.8	191	27.3	.507	15.1	.069	.308	2010	15.5	11.1	11.5	91.8	29.3	30.6
4 25 PCT T	17.0	23.9	63	17.2	.718	8.9	.069	.937	1990	15.7	2.9	7.1	5.8	8.0	7.1
5 10 PCT T	19.3	10.0	27	12.3	1.231	5.5	.059	.799	1980	17.0	.5	1.2	1.1	4.2	2.2
6 25 PCT T	17.0	23.9	63	17.3	.722	9.0	.069	.939	1990	15.7	2.5	7.1	5.8	8.1	7.1
7 90 PCT T	2.6	88.3	224	99.5	.509	9.5	.068	.307	2030	19.8	10.2	99.0	33.3	30.9	38.6
8 25 PCT T	17.0	23.9	63	17.0	.710	9.2	.069	.932	1990	15.7	2.3	7.0	6.0	7.9	7.1
9 C.T.	23.8	0.0	0	9.2	R	R	.059	R	2000	18.6	63.7	2.2	.1	3.6	0.0
1 IDLE	17.9	0.0	0	9.2	R	R	.060	R	630	16.7	9.5	3.7	.2	5.8	0.0
2 25 PCT T	17.0	29.2	63	17.6	.727	9.5	.063	.992	2010	15.8	2.2	6.3	6.1	8.1	7.2
3 55 PCT T	11.3	53.6	191	27.5	.513	15.6	.069	.312	2000	15.5	9.8	16.3	92.2	29.3	30.9
4 25 PCT T	17.0	24.1	63	17.1	.710	9.0	.069	.932	2000	15.7	2.2	6.5	5.8	7.9	7.2
5 10 PCT T	19.3	9.3	29	12.6	1.358	6.2	.059	.826	1990	17.0	.5	1.1	1.1	4.3	2.0
6 25 PCT T	17.0	23.8	63	17.1	.717	8.9	.063	.936	1980	15.8	2.1	6.2	5.7	7.9	7.1
7 90 PCT T	2.6	89.1	231	99.6	.508	9.5	.069	.309	2030	19.6	20.6	51.7	33.0	30.2	38.8
8 25 PCT T	17.1	29.6	65	16.9	.682	9.0	.063	.918	1980	15.8	1.9	6.1	5.9	7.8	7.3
9 C.T.	23.8	0.0	0	9.2	R	R	.053	R	2000	19.0	54.0	2.0	.1	3.6	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 7.2 91 19.8
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 8.2 95 15.0

TWO CYCLE COMPOSITE -

HC- FID	0.35(7.2) + 0.65(8.2) =	7.811	G/KW	HR	(5.825 G/MI)
CO- NDIR	0.35(91.2) + 0.65(99.5) =	93.368	G/KW	HR	(32.339 G/MI)
NOx-CL	0.35(19.8) + 0.65(15.0) =	14.999	G/KW	HR	(11.199 G/MI)
	HC + NOX =	22.755	G/KW	HR	(16.969 G/MI)
	SFC =	.390	KG/KW	HR	(.691 G/MI)

APPENDIX D

DRESSERATOR INDUCTOR EVALUATIONS

D-1 Summary of the Results
D-2 through D-33 Computer Printouts - Engine 2
D-34 through D-51 Computer Printouts - Engine 1

TABLE D-1. DRESSERATOR EVALUATIONS

Test No.	Run No.	Type Test	Description	Gram/kW Hr HC	CO	NO_x	HC+NO_x	Kg/kW Hr SFC	Appendix Table
206	1	9-EPA	Dresserator and HEI - As Received	11.397	82.106	13.565	24.962	.468	D-2
	2		Dresserator and HEI - Leaner Air Bleed Setting	8.130	42.015	11.830	19.960	.457	D-3
206	1	WOT	Dresserator and HEI	2.42	22.30	17.41	19.83	.320	D-4
219	2	9-EPA	Carb 6606 - HEIWOVA - Mod BL-Ported In-Ex Man	6.043	51.196	10.381	16.424	.444	C-37
	3		Carb 6606 - HEIWVA - Mod BL-Ported In-Ex Man	7.811	43.368	14.944	22.755	.390	C-38
220	1-6	S.S.	DI-HEI Port Int+Exh - Modal Evaluations						D-5 - D-12
221-224			DI-HEI Port Int+Exh. Manual EGR on Intake Manifold						
221	1-3	S.S.	1.44 Rod Setting - Modal Evaluations						D-13 - D-14
222	1-4	S.S.	1.47 Rod Setting - Modal Evaluations						D-15 - D-16
223	1-4	S.S.	1.50 Rod Setting - Modal Evaluations						D-17 - D-18
224	1	S.S.	1.53 Rod Setting - Evaluation of 90% Mode						D-19
	2		1.56 Rod Setting - Evaluation of 90% Mode						D-20
229	1	9-EPA	DI-TR-HEI NOVA-NOAI-14BTDC-1.44 Rod	2.043	7.517	10.055	12.097	.419	D-21
	2		+.25 M1+9	2.246	6.776	9.822	12.068	.412	D-22
	3		Run 1 Conf. + Vac. Adv.	3.016	13.134	14.143	17.159	.378	D-23
	2&3	WOT		0.20	8.99	12.74	12.94	.291	D-24
230	1	9-EPA	DI-TR-HEI AIXCT NOVA 1.44 Rod +.25BAinM1&9	2.270	6.537	10.510	12.779	.421	D-25
	2		Run 1 Conf. + Vac. Adv.	4.200	12.843	15.314	19.514	.389	D-26
	3		Run 1 Conf. + 1250 NLRPM at CT	0.077	4.693	9.504	9.581	.442	D-27
		WOT		0.12	1.74	12.85	-	.292	D-28
231	1-6	S.S.	DI-TR-HEI CT Optimization Evaluations						D-29 - D-31
232	1	9-EPA	DI-TR-HEI-MEGR AIXCT 14 BWVA-1.44 Rod	0.194	6.624	6.355	6.549	.411	D-32
	2[a]		x 1.5M7	0.815	8.268	8.530	9.344	.406	D-33

[a] Set-up reproducibility problems on the 90 percent mode was the reason Run 2 results differ from Run 1 results.

TABLE D-1 (Cont'd.) DRESSERATOR EVALUATIONS

Test No.	Run No.	Type Test	Description	Gram/kW Hr HC	CO	NO_x	HC+NO_x	Kg/ kW Hr SFC	Appendix Table
125	2	S.S.	DI-PL-HEI 25 Pct NOAI-30BTDC						D-34
	3		DI-PL-HEI 55 Pct NOAI-25BTDC						D-35
	4		DI-PL-HEI 10 Pct NOAI-30BTDC						D-36
	5		DI-PL-HEI 90 Pct NOAI-14BTDC						D-37
	6		DI-PL-HEI CT NOAI-14BTDC-600NL RPM						D-38
	7		DI-PL-HEI CT-DEC NOAI-14BTDC RPM=NLRPM						D-39
126	2	S.S.	DI-PL-HEI 25 Pct WAI-30BTDC						D-40
	3		DI-PL-HEI 55 Pct WAI-24BTDC						D-41
	4		DI-PL-HEI 10 Pct WAI-30BTDC						D-42
	5R		DI-PL-HEI 90 Pct WAI-14BTDC Less than 90 Pct						D-43
127	1	S.S.	DI-TR-HEI WOT WAI-14BTDC						D-44
	2		DI-TR-HEI WOT NOAI-14BTDC						D-45
128	2	S.S.	DI-PL-HEI NOAI Cyl to Cyl A/F-148-1.47Rod						D-46
129	1	9-EPA	DI-PL-HEI NoEGR-NOAI-14B NOVA-1.44Rods+BA	19.461	83.385	8.467	27.928	.468	D-47
	2		DI-Same as Run 1 except BPEGR .53X7 Coil	9.980	97.458	6.937	16.917	.474	D-48
	3		DI-Same as Run 02 Except WAIXCT	6.413	20.465	6.666	13.079	.475	D-49
	3XA		DI-Run 03 with Mode 9 at 1100NLRPM - R4M1	0.708	15.377	6.717	7.425	.490	D-50
	3XB		DI-Run 03 with Modes 7+9 Inserted - R5M3+4M1	0.709	17.394	4.170	4.878	.497	D-51

TABLE D-2. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-206 RUN-01 DRESSERATOR + HEI 09-16-76 K= 1.036 HUM= 12.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	5680	7.370	10.30	93	18.331	2268	82	1892	2	.232	19.0	427	.9	0.0	950
2 25 PCT T	1090	1.157	19.29	675	15.521	9752	70	1968	196	.077	6.0	113	11.2	17.1	376
3 55 PCT T	700	.376	19.29	1650	19.695	19061	76	726	593	.197	11.2	107	79.8	37.7	299
4 25 PCT T	1060	1.299	19.09	660	15.506	9752	76	1695	193	.077	5.9	127	11.0	17.1	381
5 10 PCT T	1190	2.960	18.52	270	16.111	7489	61	2308	93	.057	3.5	132	2.5	6.8	950
6 25 PCT T	1050	1.306	19.29	695	15.666	9752	75	1692	138	.077	5.8	126	10.6	17.1	381
7 90 PCT T	670	.511	13.95	2300	19.537	19278	101	1369	1099	.113	11.9	155	118.6	61.7	53
8 25 PCT T	1000	1.790	13.95	560	15.855	9752	70	2229	118	.077	5.9	171	9.1	17.1	391
9 C.T.	69000	3.860	9.85	18	15.626	2091	903	1019	1	.193	129.2	196	.1	0.0	602
1 IDLE	6880	7.370	10.30	92	18.970	2268	98	1828	2	.232	22.8	424	.9	0.0	957
2 25 PCT T	1690	1.097	19.39	690	15.679	9752	117	1378	198	.077	9.0	106	11.9	17.1	381
3 55 PCT T	1060	.997	19.39	1700	15.007	19061	113	990	598	.197	16.6	138	80.5	37.7	236
4 25 PCT T	1090	1.038	19.29	720	15.397	9752	75	1328	157	.077	5.8	102	12.1	17.1	373
5 10 PCT T	1330	2.800	13.38	225	16.333	7489	70	2592	35	.057	4.0	148	2.0	6.8	957
6 25 PCT T	1120	1.178	19.29	665	15.595	9752	80	1992	199	.077	6.2	115	11.1	17.1	381
7 90 PCT T	620	.395	13.80	2275	19.265	19278	95	1079	1058	.113	10.7	122	119.5	61.5	46
8 25 PCT T	1170	1.790	13.95	560	15.874	9752	82	2221	118	.077	6.3	171	9.1	17.1	391
9 C.T.	69000	3.910	9.78	19	15.609	2091	909	1033	1	.193	129.3	198	.1	0.0	602

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- NV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOx	FUEL	POWER
1 IDLE	17.7	0.0	0	5.0	R	R	.088	R	600	11.9	9.6	28.9	.2	6.2	0.0
2 25 PCT T	19.8	23.0	60	21.5	.936	6.9	.070	.570	2000	19.3	3.1	7.5	9.6	8.8	7.3
3 55 PCT T	9.6	50.5	133	31.0	.619	10.8	.066	.373	2000	15.1	5.7	7.1	32.8	29.3	30.5
4 25 PCT T	15.0	23.0	60	21.5	.936	6.2	.070	.570	2000	19.3	3.0	8.9	9.5	8.8	7.3
5 10 PCT T	17.7	9.2	24	16.5	1.797	9.7	.073	1.093	2000	13.6	1.8	8.8	1.0	5.0	2.1
6 25 PCT T	15.0	23.0	60	21.5	.936	6.0	.071	.570	2000	19.1	2.9	8.9	9.9	8.8	7.3
7 90 PCT T	2.1	82.7	217	42.5	.519	12.8	.066	.312	2000	15.3	5.8	10.3	98.7	25.6	38.9
8 25 PCT T	15.9	23.0	60	21.5	.936	5.2	.072	.570	2000	13.9	2.8	11.9	3.7	8.8	7.3
9 C.T.	23.7	0.0	0	9.5	R	R	.080	R	2000	12.9	65.5	9.7	.0	3.9	0.0
1 IDLE	18.0	0.0	0	5.0	R	R	.089	R	2000	11.3	10.8	28.8	.2	6.2	0.0
2 25 PCT T	15.0	23.0	60	21.5	.936	6.5	.071	.570	2000	19.1	9.3	7.2	9.6	8.8	7.3
3 55 PCT T	9.3	50.5	133	31.0	.619	10.9	.068	.373	2000	19.8	7.9	9.9	32.7	29.3	30.5
4 25 PCT T	19.7	22.9	60	21.5	.937	6.9	.069	.570	2000	19.9	2.7	6.9	9.9	8.8	7.3
5 10 PCT T	18.0	9.2	24	16.5	1.798	3.9	.075	1.099	2000	13.9	1.9	10.0	.8	5.0	2.1
6 25 PCT T	15.0	22.9	60	21.5	.937	6.3	.070	.570	2000	19.2	2.9	7.8	9.5	8.8	7.3
7 90 PCT T	1.8	82.5	217	42.5	.515	12.9	.069	.313	2000	15.6	5.1	8.3	98.5	25.6	38.3
8 25 PCT T	15.9	23.0	60	21.5	.936	5.2	.072	.570	2000	13.9	3.0	11.6	3.7	8.8	7.3
9 C.T.	23.7	0.0	0	9.5	R	R	.080	R	2000	12.5	61.9	10.0	.0	3.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 10.9 83 13.5

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 11.7 82 13.6

TWO CYCLE COMPOSITE -

HC- FID 0.35(10.9) + 0.65(11.7) = 11.397 G/KW HR (8.999 88)

CO- NDIR 0.35(83.2) + 0.65(81.5) = 82.106 G/KW HR (61.226 88)

NOX-CL 0.35(13.5) + 0.65(13.6) = 13.565 G/KW HR (10.116 88)

HC + NOX = 24.962 G/KW HR (18.619 88)

SFC = .968 KG/KW HR (.769 88)

TABLE D-3. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-206 RUN-02 DRESSERATOR + HET 09-16-76 K= 1.071 HUM= 19.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	3120	4.180	11.81	55	14.398	2041	65	1054	2	.232	10.9	245	.6	0.0	460
2 25 PCT T	600	.376	13.95	620	14.393	9525	95	502	196	.077	3.5	39	11.2	17.3	358
3 55 PCT T	460	.170	13.52	1312	13.742	15195	57	379	516	.147	8.9	56	75.9	38.0	97
4 25 PCT T	460	.525	14.29	580	14.817	9525	39	682	133	.077	2.6	53	10.2	17.3	373
5 10 PCT T	700	1.519	13.95	230	15.599	7257	37	1928	38	.057	2.1	81	2.2	6.9	452
6 25 PCT T	270	.181	13.95	710	14.142	9525	21	296	170	.077	1.6	19	13.1	17.3	335
7 90 PCT T	480	.251	13.11	1700	13.915	19278	78	729	869	.113	8.8	82	98.2	62.1	190
8 25 PCT T	410	.493	14.09	430	14.619	9525	30	436	196	.077	2.3	99	11.2	17.3	361
9 C.T.	69000	3.210	5.24	17	15.371	1588	713	670	1	.193	101.9	96	.1	0.0	602
1 IDLE	9000	5.180	11.21	53	16.851	1819	50	1127	2	.232	11.5	261	.5	0.0	472
2 25 PCT T	820	.525	14.09	540	14.708	9525	60	687	136	.077	4.6	53	10.5	17.3	366
3 55 PCT T	600	.134	13.52	1225	13.729	15195	75	305	482	.147	11.0	45	70.9	38.0	206
4 25 PCT T	590	.525	14.29	600	14.832	9525	43	681	137	.077	3.3	52	10.6	17.3	358
5 10 PCT T	720	1.519	13.95	245	15.594	7031	37	1383	39	.057	2.1	79	2.2	6.9	442
6 25 PCT T	530	.968	14.24	600	14.748	9299	38	595	139	.077	2.9	46	10.3	17.3	366
7 90 PCT T	530	.251	13.11	1650	13.921	19051	85	720	833	.113	9.6	81	99.2	62.2	190
8 25 PCT T	530	.706	14.24	580	15.004	9299	37	884	128	.077	2.9	68	9.8	17.3	373
9 C.T.	69000	3.210	5.24	18	15.371	1588	713	670	1	.193	101.9	96	.1	0.0	602

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	18.1	0.0	0	9.5	R	R	.076	R	600	13.2	7.3	39.0	.3	5.6	0.0
2 25 PCT T	19.1	23.1	61	21.0	.908	4.9	.065	.552	2000	15.9	2.9	5.9	5.0	8.7	7.3
3 55 PCT T	3.8	51.0	134	33.5	.657	10.3	.062	.500	2000	16.1	6.0	7.8	34.1	26.9	30.5
4 25 PCT T	19.7	23.2	61	21.0	.907	5.0	.067	.552	2000	15.0	1.8	7.3	9.6	8.7	7.3
5 10 PCT T	17.8	9.3	24	16.0	1.729	9.2	.070	1.051	2000	14.2	1.5	11.3	1.0	4.9	2.1
6 25 PCT T	13.2	23.1	61	21.0	.908	7.4	.069	.552	2000	15.7	1.1	2.6	5.9	8.7	7.3
7 90 PCT T	7.5	83.3	219	92.5	.510	10.4	.041	.310	2000	16.5	6.2	11.5	99.1	25.7	38.3
8 25 PCT T	19.2	23.2	61	21.0	.907	6.9	.066	.552	2000	15.2	1.6	6.8	5.0	8.7	7.3
9 C.T.	23.7	0.0	0	3.5	R	R	.078	R	2000	12.7	72.0	13.3	.0	2.7	0.0
1 IDLE	18.4	0.0	0	9.0	R	R	.079	R	2000	12.6	7.7	33.5	.2	5.1	0.0
2 25 PCT T	19.9	23.2	61	21.0	.907	5.9	.066	.552	2000	15.1	3.1	6.8	5.0	8.8	7.3
3 55 PCT T	8.1	51.0	134	33.5	.657	9.6	.062	.500	2000	16.2	7.3	5.7	33.9	26.8	30.5
4 25 PCT T	19.1	23.2	61	21.0	.907	6.0	.067	.552	2000	15.0	2.2	6.7	5.0	8.8	7.3
5 10 PCT T	17.9	9.3	24	15.5	1.673	9.3	.070	1.018	2000	14.2	1.9	10.1	1.1	4.8	2.1
6 25 PCT T	19.9	23.2	61	20.5	.884	5.9	.066	.530	2000	15.1	1.9	5.9	4.9	8.6	7.3
7 90 PCT T	7.5	83.5	219	92.0	.503	10.1	.061	.304	2000	16.5	6.9	10.9	95.0	25.8	38.4
8 25 PCT T	19.7	23.2	61	20.5	.884	5.6	.066	.530	2000	14.8	1.9	8.7	4.7	8.6	7.3
9 C.T.	23.7	0.0	0	3.5	R	R	.078	R	2000	12.7	68.0	12.3	.0	2.7	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 7.8 90 12.3

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 8.3 93 11.6

TWO CYCLE COMPOSITE -

HC- FID 0.35(7.8) + 0.65(8.3) = 8.130 G/KW HR (6.062 G/HP HR)

CO- NDIR 0.35(49.8) + 0.65(93.2) = 82.015 G/KW HR (61.331 G/HP HR)

NOX-CL 0.35(12.3) + 0.65(11.4) = 11.830 G/KW HR (8.822 G/HP HR)

HC + NOX = 19.960 G/KW HR (14.884 G/HP HR)

SFC = .957 KG/KW HR (.752 G/HP HR)

TABLE D-4. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-02 TEST-206 RUN-NOT 04-14-76 REFRIGERATOR+HEI K= 1.071 HUM= 19.4 G/KG

MODE	PPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	1280	.428	13.93	2532	19.709	21772	215	1880	1196	215.1	1880	1280.3	68.6	20
2	2000	1360	.350	13.07	2159	18.573	19509	220	1015	1030	219.7	1015	1103.1	60.9	20
3	2000	1220	.257	13.35	1648	18.799	19509	195	737	776	194.9	737	831.5	67.2	20

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- NV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1		.9	92.0	242	98.0	2.35	20.57	13.88	.522	15.1	.066	3.16	27.58	17.59	.317
2		.8	81.8	213	93.0	2.75	12.70	12.88	.531	16.3	.061	3.68	17.03	17.27	.327
3		.8	90.1	237	93.0	2.21	8.39	8.79	.477	16.1	.062	2.96	11.19	11.79	.291

ID = D

TABLE D-5. STEADY STATE EMISSIONS BY EPA PROCEDUPE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-220 RUN-1A 08-06-76 DRESSERATOR - IDLE -HEI-PORT IN+EX- 9 BTDC K= 1.100 HUM= 17.3 G/KG

		CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				VAC.
MODE	RPM	HC-FID	CO	CO2	NOX-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOX-CL	CKW	MM
1	600	69000	7.980	6.09	29	21.218	3357	1193	2529	1	1193.5	2529	1.9	0.0	927
2	600	6112	6.350	9.32	31	16.370	2091	87	1599	1	87.3	1599	1.9	0.0	972
3	600	3988	9.630	10.91	38	15.937	1950	50	1182	2	50.2	1182	1.8	0.0	978
9	600	3168	9.960	10.76	38	15.581	1905	99	1102	2	99.2	1102	1.7	0.0	978
5	600	3956	9.990	10.30	39	15.609	1860	97	1195	1	96.8	1195	1.5	0.0	978
6	600	9032	5.120	10.19	31	15.770	1819	53	1190	1	53.0	1190	1.3	0.0	975
7	600	9352	.169	9.22	9	9.857	1905	91	69	0	91.9	69	.3	0.0	353

		-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------								---CALC---		-------G/KW HR-------			BFC
MODE	ID	MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	HC	CO	NOX	KG/KW HR
1	1.50	16.8	0.0	0	7.9	R	R	R	R	8.9	.113	R	R	R	R
2	1.99	18.6	0.0	0	9.5	R	R	R	R	12.8	.078	R	R	R	R
3	1.38	18.8	0.0	0	9.3	R	R	R	R	13.8	.072	R	R	R	R
9	1.31	18.8	0.0	0	9.2	R	R	R	R	13.7	.073	R	R	R	R
5	1.25	18.8	0.0	0	9.1	R	R	R	R	13.5	.079	R	R	R	R
6	1.19	18.7	0.0	0	9.0	R	R	R	R	13.9	.079	R	R	R	R
7	1.13	13.9	0.0	0	9.2	R	R	R	R	22.0	.095	R	R	R	R

ID = ROD SET.

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-220 RUN-1B 08-13-76 DRESSERATOR - RERUN OF RUN 1A CONDITIONS K= 1.089 HUM= 15.6 G/KG

		CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				VAC.
MODE	RPM	HC-FID	CO	CO2	NOX-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOx-CL	CKW	MM
1	600	2996	2.390	12.38	95	15.009	1633	31	519	2	30.9	519	1.8	0.0	985
2	610	2688	3.210	11.73	97	15.296	1729	35	733	2	39.6	733	1.9	0.0	980
3	600	3956	.511	12.12	29	13.017	1592	96	122	1	95.7	122	1.0	0.0	955
9	605	1600	1.019	12.93	97	19.130	1678	21	295	2	21.5	295	2.0	0.0	967
5	600	2290	.590	12.52	31	13.311	1588	30	130	1	29.9	130	1.3	0.0	962
6	600	9160	.337	11.98	23	12.279	1997	56	83	1	56.3	83	1.0	0.0	952

		-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------								---CALC---		-------G/KW HR-------			BFC
MODE	ID	MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	HC	CO	NOX	KG/KW HR
1	1.31	19.1	0.0	0	3.6	R	R	R	R	19.5	.069	R	R	R	R
2	1.28	18.9	0.0	0	3.8	R	R	R	R	19.2	.070	R	R	R	R
3	1.25	17.9	0.0	0	3.9	R	R	R	R	16.9	.059	R	R	R	R
9	1.23	18.9	0.0	0	3.7	R	R	R	R	15.6	.069	R	R	R	R
5	1.22	18.2	0.0	0	3.5	R	R	R	R	16.5	.060	R	R	R	R
6	1.20	17.8	0.0	0	3.3	R	R	R	R	17.8	.056	R	R	R	R

ID = ROD SET.

TABLE D-6. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-220 RUN-1C 08-13-76 DRESSERATOR - 1.99 RODS + 0 TO 1 AIR BLEED K= 1.089 HUM= 15.6 G/KG

		CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				VAC.
MODE	RPM	HC-FID	CO	CO2	NOX-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOX-CL	CKW	MM
1	600	3520	5.990	10.07	90	15.913	1819	96	1253	2	95.9	1253	1.6	0.0	983
2	600	2688	3.500	11.29	99	15.095	1819	37	853	2	36.8	853	1.9	0.0	983
3	600	2112	1.510	12.25	99	13.998	1729	29	376	2	29.3	376	1.9	0.0	967
4	600	1972	.900	12.65	92	13.215	1678	21	103	2	21.0	103	1.9	0.0	957
5	575	2880	.170	11.86	32	12.350	1633	92	95	1	92.3	95	1.5	0.0	939

		-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------								---CALC---		-------G/KW HR------			BFC
MODE	ID	MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	HC	CO	NOX	KG/KW HR
1	0.00	19.0	0.0	0	9.0	R	R	R	R	13.3	.075	R	R	R	R
2	0.25	19.0	0.0	0	9.0	R	R	R	R	19.3	.070	R	R	R	R
3	0.50	18.9	0.0	0	3.8	R	R	R	R	15.6	.064	R	R	R	R
4	0.75	18.0	0.0	0	3.7	R	R	R	R	16.7	.060	R	R	R	R
5	1.00	17.3	0.0	0	3.6	R	R	R	R	17.8	.056	R	R	R	R

ID = AIR BLEED

TABLE D-7. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-220 RUN-2A 08-06-76 DRESSERATOR -25 PCT-HEI-PORT IN+EX-19 BTDC K= 1.080 HUM= 15.3 G/KG

		CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				VAC.
MODE	RPM	HC-FID	CO	CO2	NOX-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOX-CL	CKW	MM
1	2000	2690	7.990	9.93	115	17.727	10932	189	9953	29	189.0	9953	25.9	17.9	932
2	2000	2032	5.120	11.36	260	16.719	9798	137	6063	51	137.3	6063	59.7	17.9	934
3	2000	536	.963	13.78	990	14.809	8895	36	1162	97	36.9	1162	105.0	17.9	919
4	2000	79	.072	12.79	510	12.870	8090	6	100	117	5.7	100	126.9	17.9	373
5	2000	120	.115	11.29	230	11.368	10115	12	206	68	11.8	206	73.9	17.9	292

		-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE--------								---CALC---		-------G/KW HR------			SFC
MODE	ID	MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	HC	CO	NOX	KG/KW HR
1	1.53	17.0	29.0	63	29.1	8.01	921.56	1.00	1.006	11.7	.086	10.79	565.32	1.39	.612
2	1.50	17.1	29.0	63	21.6	5.81	256.78	2.19	.901	12.8	.078	7.80	349.35	2.87	.548
3	1.47	16.5	29.0	63	19.5	1.54	99.22	9.12	.813	15.0	.067	2.07	66.01	5.52	.495
4	1.44	19.7	29.0	63	19.6	.24	9.24	9.95	.817	17.2	.058	.32	5.69	6.69	.497
5	1.41	11.5	29.0	63	22.3	.50	8.72	2.88	.929	14.3	.052	.67	11.69	3.86	.565

ID = ROD SET.

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-220 RUN-2B 08-06-76 DRESSERATOR -25 PCT-HEI-PORT IN+EX-WITH VA K= 1.080 HUM= 15.3 G/KG

		CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				VAC.
MODE	RPM	HC-FID	CO	CO2	NOX-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOX-CL	CKW	MM
1	2000	3152	8.260	9.93	390	18.057	10029	209	9263	72	203.6	9263	77.7	17.9	950
2	2000	2608	6.050	10.76	920	17.111	9163	161	6599	75	161.9	6599	80.7	17.9	952
3	2000	1509	1.990	13.21	1198	15.321	7938	89	2030	197	88.8	2030	213.3	17.9	952
4	2000	980	.131	12.93	313	13.115	7575	31	153	60	31.1	153	64.8	17.9	929
5	2000	688	.187	10.69	325	10.903	7843	55	273	78	54.8	273	84.9	17.9	368

		-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE--------								---CALC---		-------G/KW HR------			SFC
MODE	ID	MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	HC	CO	NOX	KG/KW HR
1	1.53	17.7	29.0	63	22.1	8.62	392.33	3.09	.920	11.4	.087	11.57	526.12	4.08	.560
2	1.50	17.8	29.0	63	20.2	6.83	277.17	3.16	.841	12.4	.081	9.17	371.69	4.24	.512
3	1.47	17.8	29.0	63	17.5	3.76	85.99	8.36	.729	14.3	.070	5.05	115.32	11.21	.443
4	1.44	16.7	29.0	63	16.7	1.32	6.47	2.59	.695	16.9	.059	1.76	8.67	3.41	.423
5	1.41	19.5	29.0	63	17.4	2.32	11.58	3.31	.729	20.1	.050	3.11	15.52	4.44	.440

ID = ROD SET.

TABLE D-8. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
ENGINE-02 TEST-220 RUN-3A 08-06-76 DRESSERATOR -55 PCT-HEI-PORT IN+EX-19 BTDC K= 1.090 HUM= 16.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	1990	1728	9.870	11.73	513	16.799	19832	176	8686	150	176.0	8686	163.9	39.1	287
2	1990	928	1.919	13.69	1277	15.165	13562	95	2563	379	99.6	2563	913.2	39.1	279
3	1990	202	.300	13.69	1312	13.963	13109	21	568	909	21.9	568	995.7	39.3	299
4	1990	109	.192	13.35	1198	13.509	13381	12	289	378	11.6	289	911.6	39.3	218
5	2000	38	.109	12.12	711	12.228	19970	5	298	279	5.0	298	309.9	39.5	137

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	1.53	11.3	52.5	138	32.7	3.92	168.55	2.92	.623	12.8	.078	9.58	226.03	3.91	.379
2	1.50	10.8	52.5	138	29.9	1.83	99.79	7.36	.570	14.6	.069	2.96	66.70	9.87	.347
3	1.97	9.8	52.7	139	28.9	.92	11.07	7.99	.549	15.9	.063	.56	19.79	10.69	.339
4	1.99	8.6	52.7	139	29.5	.22	5.51	7.33	.560	16.9	.061	.30	7.39	9.83	.340
5	1.91	5.9	53.0	139	31.9	.10	9.79	5.39	.602	18.1	.055	.13	6.92	7.23	.366

ID = ROD SET.

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
ENGINE-02 TEST-220 RUN-3B 08-06-76 DRESSERATOR -55 PCT-HEI-PORT IN+EX-WITH VA K= 1.090 HUM= 16.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	2032	9.120	11.86	1195	16.213	13789	198	7078	337	198.9	7078	367.7	39.5	315
2	1990	1712	3.030	12.79	1561	16.016	13159	161	5027	926	161.2	5027	963.9	39.3	302
3	2000	1280	.856	13.23	2630	15.232	12020	115	1369	689	115.1	1369	750.9	39.5	307
4	2000	608	.192	13.31	2972	13.520	11798	59	299	713	59.9	299	777.2	39.5	272
5	2000	316	.131	11.99	1230	12.156	12203	35	265	910	35.3	265	996.7	39.5	229

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	1.53	12.9	53.0	139	30.9	3.83	136.67	6.52	.573	13.3	.075	5.19	183.28	8.79	.349
2	1.50	11.9	52.7	139	29.0	3.13	97.55	8.26	.550	13.6	.074	9.19	130.82	11.08	.339
3	1.97	12.1	53.0	139	26.5	2.22	26.39	13.31	.500	14.6	.069	2.98	35.32	17.89	.309
4	1.99	10.7	53.0	139	25.9	1.15	9.81	13.77	.489	16.9	.061	1.59	6.45	18.97	.297
5	1.91	8.8	53.0	139	26.9	.68	5.12	7.91	.507	18.1	.055	.91	6.87	10.61	.309

ID = ROD SET.

TABLE D-9. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-220 RUN-9A 08-06-76 DRESSERATOR -10 PCT-HEI-PORT IN+EX-19 BTDC K= 1.080 HUM= 15.3 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	3712	9.680	8.19	68	18.252	9117	216	9767	11	216.0	9767	12.2	7.0	990
2	2000	2098	6.270	10.53	106	17.037	7620	106	5665	16	105.8	5665	17.0	7.0	998
3	2010	260	.706	13.64	203	19.376	6759	17	671	32	13.8	671	39.2	7.0	975
4	1990	98	.082	11.73	100	11.818	7076	3	100	20	3.2	100	21.5	6.9	929
5	1990	160	.115	11.00	39	11.132	7711	12	160	9	12.2	160	9.7	6.9	373

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE NV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	1.53	19.3	9.9	25	20.1	23.63	1068.69	1.23	2.197	11.1	.090	31.69	1933.19	1.66	1.306
2	1.50	19.6	9.9	25	16.8	11.58	619.86	1.72	1.799	12.9	.081	15.53	831.25	2.31	1.091
3	1.97	18.7	9.9	25	19.9	1.51	73.01	3.95	1.583	15.9	.065	2.02	97.90	9.63	.963
4	1.99	16.7	9.3	25	15.6	.35	10.95	2.19	1.679	18.6	.059	.47	19.68	2.93	1.019
5	1.91	19.7	9.3	25	17.0	1.39	17.62	.99	1.825	19.7	.051	1.80	23.63	1.32	1.110

ID = ROD SET.

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-220 RUN-9B 08-06-76 DRESSERATOR -10 PCT-HEI-PORT IN+EX-WITH VA K= 1.080 HUM= 15.3 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	1990	5216	9.990	7.50	58	18.096	8029	269	8953	9	268.4	8953	9.2	7.0	516
2	1990	2816	6.730	10.19	141	17.296	6532	123	5199	18	123.3	5199	19.1	7.0	521
3	1990	1008	1.830	12.93	300	19.875	5988	92	1369	37	92.3	1369	39.7	6.9	516
4	1990	276	.136	11.29	130	11.907	5897	16	192	22	15.8	192	29.1	6.9	965
5	1990	1920	.295	9.93	21	9.884	6986	137	325	5	137.3	325	9.9	6.9	909

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE NV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	1.53	20.3	9.3	25	17.7	29.57	989.59	.99	1.898	11.1	.090	39.65	1320.29	1.26	1.155
2	1.50	20.5	9.3	25	19.9	13.56	566.21	1.95	1.599	12.2	.082	18.19	759.30	2.61	.939
3	1.97	20.3	9.3	25	12.1	4.65	199.99	4.09	1.300	14.8	.068	6.23	201.19	5.92	.791
4	1.99	18.3	9.3	25	13.0	1.73	15.66	2.95	1.398	19.3	.052	2.33	21.00	3.29	.850
5	1.91	15.9	9.3	25	19.3	15.10	35.79	.50	1.536	22.0	.045	20.24	47.93	.67	.934

ID = ROD SET.

TABLE D-10. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-220 RUN-5A 08-06-76 DRESSERATOR -90 PCT-HEI-PORT IN+EX-14 BTDC K= 1.069 HUM= 14.5 G/KG

	CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				
MODE	RPM	HC-FID	CO	CO2	NOX-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2020	2080	6.270	10.53	580	17.090	22135	312	16952	250	312.2	16952	267.9	65.3	112
2	2030	1568	9.570	11.73	990	16.980	21591	236	12099	931	236.9	12099	960.3	65.7	109
3	2090	1399	3.700	11.99	1136	15.899	21228	206	10019	505	206.2	10019	590.1	66.0	99
4	2090	792	2.020	12.93	1999	15.090	20276	122	5501	669	121.5	5501	719.7	66.0	89
5	2090	290	1.098	13.35	1505	14.925	19958	38	2928	691	37.6	2928	738.9	66.0	63
6	2090	108	.628	13.99	1915	14.131	20230	17	1817	673	17.5	1817	718.9	66.0	38
7	2090	69	.902	13.69	1505	14.099	20366	10	1176	729	10.5	1176	779.2	66.0	30

	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------								---CALC---		-------G/KW HR-------			SFC
MODE	ID	MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	HC	CO	NOX	KG/KW HR
1	1.63	9.9	87.6	228	98.8	3.66	192.68	2.93	.557	12.9	.081	9.90	258.39	3.93	.339
2	1.59	9.3	88.1	228	97.6	2.75	190.99	5.02	.590	13.0	.077	3.69	189.01	6.73	.329
3	1.56	3.9	88.5	228	96.8	2.39	116.13	5.86	.529	13.7	.073	3.21	155.73	7.86	.322
4	1.53	3.3	88.5	228	99.7	1.91	63.79	7.75	.505	19.6	.069	1.89	85.55	10.90	.307
5	1.50	2.5	88.5	228	99.0	.99	33.96	8.02	.497	15.3	.065	.59	95.59	10.75	.302
6	1.97	1.5	88.5	228	99.6	.20	21.07	7.80	.509	15.7	.064	.27	28.26	10.96	.307
7	1.91	1.2	88.5	228	99.9	.12	13.69	8.90	.507	15.8	.063	.16	18.29	11.26	.309

ID = ROD SET.

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-220 RUN-5B 08-06-76 DRESSERATOR -90 PCT-HEI-PORT IN+EX-WITH VA K= 1.069 HUM= 14.5 G/KG

	CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				
MODE	RPM	HC-FID	CO	CO2	NOX-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2060	1952	6.880	10.19	588	17.296	23678	309	19025	267	309.9	19025	285.7	66.9	109
2	2060	1632	5.290	11.12	871	16.598	22271	253	19296	389	252.9	19296	916.0	66.9	102
3	2060	1376	9.180	11.86	1090	16.198	21591	211	11255	960	210.6	11255	991.9	66.9	99
4	2060	1088	2.760	12.52	1937	15.909	20912	165	7388	632	164.5	7388	675.7	66.7	99
5	2060	590	1.919	13.21	1392	14.690	20003	83	3903	629	83.5	3903	672.7	66.8	76
6	2060	152	.779	13.99	1392	14.286	20689	25	2279	669	24.9	2279	715.2	66.7	38
7	2060	96	.908	13.99	1615	13.909	20775	16	1232	801	16.2	1232	856.0	66.7	30

	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------								---CALC---		-------G/KW HR-------			SFC
MODE	ID	MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	HC	CO	NOX	KG/KW HR
1	1.63	9.1	89.7	229	92.2	3.55	218.99	3.07	.582	12.1	.082	9.77	293.00	9.12	.359
2	1.59	9.0	89.7	229	99.1	2.90	163.60	9.97	.597	12.9	.078	3.89	219.90	5.99	.333
3	1.56	3.9	89.7	229	97.6	2.92	129.25	5.29	.531	13.3	.075	3.29	173.33	7.09	.323
4	1.53	3.9	89.9	228	95.0	1.89	89.89	7.26	.503	19.2	.071	2.53	113.77	9.79	.306
5	1.50	3.0	89.5	228	99.1	.96	49.82	7.23	.493	15.0	.067	1.29	60.10	9.69	.300
6	1.97	1.5	89.9	228	95.6	.29	26.17	7.68	.510	15.5	.065	.38	35.10	10.30	.310
7	1.91	1.2	89.9	228	95.8	.19	19.15	9.20	.512	15.9	.063	.25	18.97	12.33	.311

ID = ROD SET.

TABLE D-11. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-220 RUN-6A 08-06-76 DRESSERATOR - CT -MEI-PORT IN+EX-19 BTDC K= 1.090 HUM= 16.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	38900	.891	.55	11	95.865	5761	5580	226	0	5579.7	226	.5	0.0	589
2	2000	17600	9.340	2.22	23	29.690	9581	3567	1355	1	3567.9	1355	1.3	0.0	589
3	2000	57600	3.960	6.17	19	16.930	3175	1217	1596	1	1217.5	1596	1.3	0.0	599
9	1990	59080	.915	5.21	11	11.319	2313	1163	171	1	1163.2	171	.8	0.0	592
5	2000	55680	.275	9.01	9	10.079	1819	1093	100	1	1092.6	100	.6	0.0	589

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	1.56	23.0	0.0	0	12.7	R	R	R	R	2.5	.397	R	R	R	R
2	1.53	23.2	0.0	0	10.1	R	R	R	R	5.3	.190	R	R	R	R
3	1.50	23.9	0.0	0	7.0	R	R	R	R	12.0	.083	R	R	R	R
9	1.97	23.3	0.0	0	5.1	R	R	R	R	17.8	.056	R	R	R	R
5	1.99	23.2	0.0	0	9.0	R	R	R	R	19.9	.050	R	R	R	R

ID = ROD SET.

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-220 RUN-6B 08-13-76 DRESSERATOR - 1.99 RODS + 0 TO 1 AIR BLEED K= 1.086 HUM= 15.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	99920	1.038	6.98	19	13.380	1819	727	289	1	727.1	289	.7	0.0	617
2	2000	93520	.613	7.32	13	12.609	1729	639	169	1	638.8	169	.6	0.0	615
3	2000	30080	.216	7.50	11	10.938	1588	968	63	1	967.7	63	.6	0.0	612
9	2000	32000	.216	5.57	8	9.157	1678	618	80	0	617.9	80	.5	0.0	592

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.00	29.3	0.0	0	9.0	R	R	R	R	15.2	.066	R	R	R	R
2	0.25	29.2	0.0	0	3.8	R	R	R	R	16.3	.061	R	R	R	R
3	0.50	29.1	0.0	0	3.5	R	R	R	R	19.2	.052	R	R	R	R
9	0.75	23.3	0.0	0	3.7	R	R	R	R	22.6	.044	R	R	R	R

ID = AIR BLEED

TABLE D-12. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

ENGINE-2 TEST-220 RUN-6C 1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
08-13-76 DRESSERATOR - 1.99+AIR BLEED+1700 RPM NL K= 1.086 HUM= 15.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	900	.077	11.36	92	11.981	5715	22	77	7	22.0	77	7.5	0.0	967
2	2000	320	.093	11.36	50	11.988	6713	21	110	10	20.7	110	10.5	0.0	932
3	2000	980	.197	11.00	52	11.200	5171	29	138	8	29.9	138	8.7	0.0	988

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	0.00	18.9	0.0	0	12.6	R	R	R	R	19.2	.052	R	R	R	R
2	0.25	17.0	0.0	0	19.8	R	R	R	R	19.1	.052	R	R	R	R
3	0.50	19.2	0.0	0	11.9	R	R	R	R	19.6	.051	R	R	R	R

ID = AIR BLEED

TABLE D-13. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-221 RUN-01 08-10-76 DRESS 1.99-MEGR ON IN MAN-10 PCT-HEI30BTDC K= 1.036 HUM= 12.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	528	.125	11.98	300	11.664	5126	26	111	99	25.7	111	95.9	7.3	967
2	2000	880	.170	11.98	165	11.797	6809	56	199	32	56.5	199	32.9	7.3	939
3	2000	720	.197	11.36	255	11.587	6991	99	166	97	99.3	166	98.8	7.3	952

MODE	ID	HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	0.88	18.9	9.7	26	11.3	2.70	11.69	9.60	1.159	18.9	.053	3.62	15.68	6.17	.705
2	0.96	17.1	9.8	26	15.0	5.93	20.87	3.33	1.536	18.7	.053	7.95	27.98	9.97	.939
3	0.31	17.8	9.8	26	14.2	9.65	17.90	9.99	1.954	14.0	.053	6.29	23.33	6.63	.889

ID = INTAKE CO2

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-221 RUN-02 08-10-76 DRESS 1.99-MEGR ON IN MAN-25 PCT-HEI30BTDC K= 1.036 HUM= 12.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	900	.125	12.52	999	12.690	7620	27	152	188	26.8	152	195.0	17.7	922
2	2000	900	.192	12.52	300	12.707	8255	29	186	65	29.0	186	67.1	17.7	361
3	2000	880	.216	12.65	170	12.969	8981	68	302	39	69.2	302	90.5	17.7	305
4	2000	1990	.325	12.52	115	13.006	9117	113	960	27	112.9	960	27.7	17.7	277

MODE	ID	HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	0.08	16.6	23.8	62	16.8	1.15	6.55	8.10	.706	17.9	.057	1.55	8.78	10.86	.930
2	1.73	19.2	23.8	62	18.2	1.25	8.02	2.79	.765	17.9	.058	1.68	10.75	3.79	.965
3	2.98	12.0	23.7	62	19.8	2.99	12.99	1.68	.835	17.0	.059	3.99	17.93	2.26	.508
4	2.80	10.9	23.7	62	20.1	9.86	19.78	1.15	.898	17.0	.059	6.52	26.53	1.55	.516

ID = INTAKE CO2

TABLE D-14. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-221 RUN-03 08-10-76 DRESS 1.99-HEGR ON IN MAN-55 PCT-HEI29BTDC K= 1.036 HUM= 12.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	720	.136	12.79	2065	13.007	12020	79	259	639	79.5	259	656.5	38.8	277
2	2000	960	.136	12.79	1207	13.039	12479	103	263	389	102.9	263	397.9	38.9	299
3	2000	880	.287	12.65	730	13.036	12701	96	566	234	96.0	566	299.7	38.9	213
4	2000	592	.389	12.65	530	13.105	13018	66	780	175	65.9	780	181.1	39.0	175
5	2000	690	.511	12.79	380	13.373	13381	72	1033	126	71.9	1033	130.8	38.9	137

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	0.08	10.9	52.1	137	26.5	1.96	9.99	12.92	.509	17.0	.059	1.96	6.69	16.66	.310
2	1.23	9.6	52.1	137	27.5	2.02	5.16	7.52	.528	17.0	.059	2.70	6.92	10.08	.321
3	1.59	8.9	52.2	137	28.0	1.88	11.08	9.61	.536	16.9	.059	2.52	14.86	6.21	.326
4	1.78	6.9	52.3	137	28.7	1.29	15.28	3.93	.549	16.9	.059	1.73	20.99	9.69	.334
5	2.07	5.9	52.2	137	29.5	1.91	20.29	2.97	.565	16.5	.061	1.89	27.19	3.32	.344

ID = INTAKE CO2

TABLE D-15. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-222 RUN-01 08-11-76 DRESS 1.97-HEGR ON IN MAN-10 PCT-HEI30BTDC K= 1.102 HUM= 17.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	720	.963	12.93	320	13.979	5851	39	819	99	39.0	819	99.0	7.2	508
2	2000	736	.927	12.93	260	13.990	6350	38	853	39	37.8	853	93.3	7.2	480
3	2000	736	.891	12.93	150	13.909	6260	37	810	22	37.9	810	29.7	7.2	472
4	2000	832	.873	12.93	98	13.897	6809	46	863	15	45.9	863	16.1	7.2	439

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	0.08	20.0	4.6	25	12.9	3.57	85.55	4.67	1.395	15.8	.063	4.79	119.72	6.27	.818
2	1.09	18.9	4.6	25	14.0	3.97	89.56	4.13	1.460	15.8	.063	5.33	120.10	5.54	.888
3	1.58	18.6	4.6	25	13.8	3.93	85.08	2.36	1.439	15.4	.063	5.26	119.10	3.16	.875
4	2.17	17.3	4.6	25	15.0	4.83	90.70	1.54	1.563	15.4	.063	6.47	121.63	2.06	.951

ID = INTAKE CO2

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-222 RUN-02 08-11-76 DRESS 1.97-HEGR ON IN MAN-25 PCT-HEI30BTDC K= 1.102 HUM= 17.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	960	1.097	12.93	1159	19.135	8165	63	1280	222	62.6	1280	295.0	17.8	937
2	2000	912	1.077	12.93	590	19.110	8119	59	1252	113	59.3	1252	149.2	17.8	922
3	2000	999	1.177	12.93	930	19.219	8396	63	1396	89	62.7	1396	92.9	17.8	909
4	2000	999	1.057	12.93	280	19.099	8528	65	1292	56	64.5	1292	62.0	17.8	381
5	2000	992	1.290	12.93	200	19.283	8936	70	1568	92	70.2	1568	95.8	17.8	361
6	2000	1280	1.328	12.93	100	19.902	9616	97	1791	22	96.7	1791	24.9	17.8	279

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	0.08	17.2	23.8	63	18.0	2.65	59.19	9.91	.755	15.6	.064	3.56	72.67	12.62	.460
2	0.92	16.6	23.9	63	17.9	2.51	53.02	9.77	.751	15.6	.064	3.37	71.10	6.90	.457
3	1.32	16.1	23.8	63	18.9	2.65	59.15	3.59	.772	15.5	.065	3.56	79.32	4.76	.470
4	1.88	15.0	23.8	63	18.8	2.73	59.79	2.38	.789	15.6	.064	3.66	73.90	3.19	.480
5	2.27	14.2	23.8	63	19.7	2.97	66.98	1.76	.826	15.4	.065	3.99	89.09	2.36	.502
6	3.30	11.0	23.8	63	21.2	4.10	75.89	.99	.889	15.3	.065	5.49	101.70	1.26	.541

ID = INTAKE CO2

TABLE D-16. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-222 RUN-03 08-11-76 DRESS 1.97-MEGR ON IN MAN-SS PCT-MEI29BTDC K= 1.101 HUM= 17.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	928	1.289	12.65	1659	14.038	13063	97	2913	513	97.5	2913	564.3	39.0	297
2	2000	800	1.097	12.93	1960	14.117	13381	86	2100	959	85.7	2100	505.9	39.1	287
3	2000	832	1.019	13.07	992	14.183	13926	89	1999	312	89.0	1999	393.3	39.1	257
4	2000	768	1.077	13.07	750	14.234	13789	84	2107	291	84.1	2107	265.6	39.1	221
5	2000	512	.963	12.93	500	13.951	13925	58	1992	166	57.7	1992	182.9	39.1	185
6	2000	320	.891	13.07	340	13.997	14379	37	1898	116	37.1	1898	127.7	39.1	137

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	0.08	11.7	52.9	137	28.8	1.88	96.59	9.90	.550	15.7	.064	2.52	62.98	13.27	.335
2	0.35	11.3	52.9	138	29.5	1.65	90.59	8.87	.563	15.6	.064	2.22	59.37	11.90	.342
3	1.05	10.1	52.9	138	29.6	1.72	37.62	6.02	.565	15.6	.064	2.31	50.96	8.07	.344
4	1.59	8.7	52.9	138	30.9	1.62	90.69	9.66	.580	15.5	.065	2.18	59.57	6.25	.353
5	1.92	7.3	52.5	138	30.7	1.11	37.99	3.20	.585	15.8	.063	1.99	50.27	9.29	.356
6	2.17	5.9	52.5	138	31.7	.72	35.69	2.29	.609	15.8	.063	.96	47.86	3.00	.368

ID = INTAKE CO2

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-222 RUN-04 08-11-76 DRESS 1.97-MEGR ON IN MAN-90 PCT-MEI19BTDC K= 1.101 HUM= 17.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	900	1.262	13.07	1765	14.377	20276	64	3595	826	63.9	3595	909.9	63.8	71
2	2000	256	1.219	13.99	1937	14.738	20366	90	3903	659	90.2	3903	725.9	63.9	53
3	2000	528	1.539	13.21	992	14.809	20912	83	9289	959	82.7	9289	999.8	64.0	38
4	2000	688	1.680	13.21	830	14.968	19958	109	9525	367	109.9	9525	909.5	64.0	15

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	0.08	2.8	85.6	225	49.7	.76	92.52	9.78	.522	15.3	.065	1.01	57.02	13.11	.318
2	0.51	2.1	85.7	225	49.9	.98	90.26	7.80	.529	15.0	.067	.64	53.98	10.96	.319
3	0.63	1.5	85.8	225	45.0	.98	50.68	5.37	.525	14.9	.067	1.31	67.96	7.20	.319
4	1.19	.6	85.8	225	49.0	1.23	53.52	4.35	.513	14.7	.068	1.66	71.78	5.83	.312

ID = INTAKE CO2

TABLE D-17. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-223 RUN-01 08-11-76 DRESS 1.50-NEGR ON IN MAN-10 PCT-HEI30BTDC K= 1.079 HUM= 19.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	1669	3.910	11.86	280	15.961	6350	76	3192	37	75.9	3192	39.7	7.2	518
2	2000	1696	3.910	11.99	240	16.095	6486	76	3183	32	78.9	3183	39.5	7.2	505
3	2000	1829	4.020	11.86	155	16.089	6577	86	3320	21	85.5	3320	22.6	7.2	498
4	2000	1632	3.750	12.12	120	16.057	6759	79	3188	17	78.8	3188	18.0	7.2	488

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.08	20.9	9.6	25	19.0	7.97	330.08	3.89	1.952	13.5	.074	10.69	992.65	5.21	.889
2	0.39	19.9	9.6	25	19.3	8.29	339.35	3.37	1.984	13.9	.074	11.09	998.38	4.52	.903
3	1.09	19.6	9.7	25	19.5	8.98	348.68	2.21	1.502	13.9	.075	12.05	967.59	2.96	.919
4	1.59	19.2	9.7	25	19.9	8.27	339.90	1.76	1.599	13.5	.074	11.10	999.11	2.36	.939

ID = INTAKE CO2

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-223 RUN-02 08-11-76 DRESS 1.50-NEGR ON IN MAN-25 PCT-HEI30BTDC K= 1.079 HUM= 19.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	2176	3.500	12.12	773	15.869	8669	136	3860	190	136.0	3860	150.9	17.9	955
2	2000	2112	3.500	12.12	590	15.862	8709	133	3882	108	132.7	3882	115.5	17.9	944
3	2000	1669	3.950	12.25	400	15.891	8709	109	3819	73	109.9	3819	78.1	17.9	937
4	2000	1696	3.900	12.25	300	15.899	8800	108	3819	55	107.8	3819	59.9	17.9	922
5	2000	1632	3.210	12.25	200	15.697	8936	107	3703	38	106.5	3703	40.7	17.9	391
6	2000	2336	3.700	11.99	68	15.958	9888	166	9631	19	165.8	9631	15.0	17.9	307

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.08	17.9	29.0	63	19.1	5.76	163.98	5.93	.797	13.6	.073	7.72	219.23	7.96	.995
2	0.51	17.5	29.0	63	19.2	5.62	169.91	4.56	.801	13.7	.073	7.59	220.98	6.11	.988
3	1.05	17.2	29.0	63	19.2	4.92	161.77	3.08	.801	13.6	.073	6.93	216.99	4.13	.988
4	1.50	16.6	29.0	63	19.4	4.57	161.56	2.39	.809	13.7	.073	6.12	216.65	3.19	.992
5	2.07	15.9	29.0	63	19.7	4.51	156.85	1.61	.822	13.9	.072	6.05	210.33	2.15	.500
6	3.29	12.1	29.0	63	21.8	7.02	196.16	.59	.909	13.5	.074	9.42	263.06	.79	.553

ID = INTAKE CO2

TABLE D-18. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

ENGINE-02 TEST-223 RUN-03 1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
08-11-76 DRESS 1.50-MEGR ON IN MAN-55 PCT-HEI29BTDC K= 1.076 HUM= 15.0 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	1600	2.990	12.25	1527	15.372	13290	158	5139	938	157.8	5139	971.6	39.3	312
2	2000	1600	2.980	12.25	1960	15.913	13336	158	5208	919	157.9	5208	951.3	39.3	290
3	2000	1760	3.070	12.38	992	15.651	13381	172	5302	282	172.0	5302	303.0	39.3	289
4	2000	1568	2.670	12.65	760	15.999	13472	156	4688	219	155.6	4688	236.0	39.9	262
5	2000	1568	2.850	12.52	500	15.599	13925	160	5156	199	160.9	5156	160.0	39.9	216
6	2000	1552	2.670	12.79	350	15.637	14061	160	4850	109	159.5	4850	112.9	39.9	178

MODE	ID	HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.08	12.3	52.7	138	29.3	3.05	99.19	8.96	.556	14.1	.071	9.09	132.95	11.35	.338
2	0.23	11.9	52.7	138	29.9	3.05	100.57	8.10	.558	14.1	.071	9.09	139.86	10.86	.339
3	0.92	11.2	52.7	138	29.5	3.32	102.37	5.99	.560	13.9	.072	9.95	137.28	7.29	.341
4	1.50	10.3	52.8	139	29.7	3.00	90.52	9.23	.663	14.1	.071	9.03	121.39	5.68	.342
5	2.07	8.5	52.8	139	30.7	3.10	99.55	2.87	.582	14.0	.071	9.15	133.50	3.85	.359
6	2.98	7.0	52.8	139	31.0	3.08	93.69	2.02	.587	14.0	.072	9.13	125.58	2.71	.357

ID = INTAKE CO2

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNI.

ENGINE-02 TEST-223 RUN-09 1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
08-11-76 DRESS 1.50-MEGR ON IN MAN-90 PCT-HEI19BTDC K= 1.076 HUM= 15.0 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	960	1.870	12.93	1989	19.909	19867	195	5039	880	195.9	5039	996.9	69.9	99
2	2000	832	1.870	12.93	1849	19.895	19913	126	5050	821	126.5	5050	883.1	69.9	89
3	2000	832	2.020	12.79	1937	19.905	19958	127	5969	639	126.7	5969	687.9	69.9	69
4	2000	992	2.250	12.79	992	15.153	20957	153	6136	995	152.6	6136	978.9	69.9	30
5	2000	928	2.250	12.79	770	15.196	20502	193	6152	396	193.1	6152	372.9	69.9	15

MODE	ID	HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.08	3.9	86.3	227	93.8	1.72	59.59	10.91	.507	14.7	.068	2.31	79.85	13.96	.309
2	0.39	3.3	86.3	227	93.9	1.50	59.74	9.71	.509	14.7	.068	2.01	80.11	13.02	.309
3	0.71	2.7	86.3	227	94.0	1.50	69.63	7.56	.510	14.7	.068	2.01	86.67	10.13	.310
4	1.05	1.2	86.9	227	95.1	1.80	72.58	5.26	.522	14.4	.069	2.42	97.33	7.05	.318
5	1.08	.6	86.9	227	95.2	1.69	72.78	4.09	.523	14.5	.069	2.27	97.59	5.49	.318

ID = INTAKE CO2

TABLE D-19. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-229 RUN-01 08-11-76 DRESS 1.53-HEGR ON IN MAN-90 PCT-HEI19BTDC K= 1.078 HUM= 15.1 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	1568	3.500	12.25	1277	15.930	20366	230	9039	592	229.7	9039	589.2	69.3	122
2	2000	1298	3.950	12.25	999	15.893	21500	199	9958	925	199.0	9958	958.9	69.7	51
3	2000	1029	2.920	13.07	690	15.607	20598	159	6936	302	159.1	6936	325.0	69.1	15

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.08	9.8	86.3	227	99.9	2.72	106.92	6.94	.529	13.6	.073	3.69	143.38	8.60	.317
2	0.71	2.0	86.7	228	97.9	2.29	111.87	5.03	.597	13.7	.073	3.08	150.02	6.75	.332
3	1.18	.6	86.0	226	95.3	1.89	76.82	3.60	.527	14.0	.071	2.97	103.02	4.83	.320

ID = INTAKE CO2

TABLE D-20. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-02 TEST-224 RUN-02 08-11-76 DRESS 1.56-HEGR ON IN MAN-90 PCT-HEI19BTDC K= 1.078 HUM= 15.1 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	1920	5.710	11.00	700	16.932	21727	284	14801	298	284.5	14801	321.9	69.9	119
2	2000	1509	4.020	11.86	618	16.052	21500	231	10876	271	231.0	10876	292.3	69.9	36

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.08	9.7	86.9	227	97.9	3.34	175.08	3.53	.559	12.6	.080	4.51	234.78	4.73	.337
2	1.27	1.9	86.9	227	97.9	2.73	128.65	3.21	.598	13.9	.079	3.66	172.53	4.30	.334

ID = INTAKE CO2

TABLE D-21. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-229 RUN-01 08-16-76 DI-TR-HEI NOVA-NOAI-19BTDC-1.99ROD+.25M1+9 K= 1.091 HUM= 16.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1312	.873	12.65	96	13.671	1588	17	205	2	.232	4.0	48	.9	0.0	467
2 25 PCT T	69	.030	13.99	990	13.528	9117	5	91	120	.077	.9	3	9.2	17.9	391
3 55 PCT T	60	.061	13.78	1300	13.848	13653	7	122	964	.197	1.0	18	68.3	39.9	259
4 25 PCT T	32	.010	13.99	510	13.509	9026	2	19	124	.077	.2	1	9.5	18.9	399
5 10 PCT T	28	.010	12.93	195	12.993	6899	2	11	37	.057	.1	1	2.1	7.5	450
6 25 PCT T	26	.010	13.99	500	13.503	8890	2	13	119	.077	.1	1	9.2	17.9	399
7 90 PCT T	25	.035	13.35	1159	13.388	20321	4	109	637	.113	.5	12	72.0	65.1	28
8 25 PCT T	26	.010	13.99	530	13.503	8895	2	13	126	.077	.1	1	9.7	18.0	399
9 C.T.	12000	.275	9.93	17	11.013	1769	210	89	1	.193	30.0	13	.1	0.0	610
1 IDLE	1952	2.390	11.73	99	14.291	1588	25	525	2	.232	5.7	122	.5	0.0	470
2 25 PCT T	169	.020	13.99	540	13.529	8890	12	27	129	.077	.9	2	9.9	18.0	399
3 55 PCT T	112	.051	14.08	1415	14.199	13517	12	98	990	.197	1.8	19	72.0	39.7	242
4 25 PCT T	89	.010	13.99	580	13.509	8936	6	13	139	.077	.5	1	10.7	18.0	399
5 10 PCT T	76	.005	12.79	205	12.803	6648	4	5	39	.057	.3	0	2.2	7.5	455
6 25 PCT T	72	.010	13.99	560	13.508	8981	5	13	135	.077	.9	1	10.9	18.0	399
7 90 PCT T	60	.030	13.69	1277	13.677	20366	10	91	689	.113	1.1	10	77.9	65.5	28
8 25 PCT T	59	.010	13.69	510	13.656	8709	9	13	118	.077	.9	1	9.1	17.8	399
9 C.T.	11680	.275	9.22	17	10.766	1678	198	87	1	.193	28.3	12	.1	0.0	610

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTO	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 IDLE	18.9	0.0	0	3.5	R	R	.062	R	600	16.1	10.9	98.8	.2	9.6	0.0
2 25 PCT T	15.9	29.0	63	20.1	.839	5.1	.061	.510	1990	16.9	1.0	3.3	5.1	8.7	7.2
3 55 PCT T	10.2	52.8	139	30.1	.570	9.0	.062	.347	2000	16.1	2.7	19.9	37.8	29.8	30.2
4 25 PCT T	15.5	29.7	65	19.9	.805	5.1	.061	.489	1990	16.9	.5	1.1	5.3	8.6	7.4
5 10 PCT T	17.7	10.1	27	15.1	1.501	3.8	.058	.913	1990	17.1	.3	.6	1.2	9.8	2.2
6 25 PCT T	15.7	29.0	63	19.6	.817	5.1	.061	.497	1990	16.9	.9	1.1	5.1	8.5	7.2
7 90 PCT T	1.1	87.3	227	99.8	.513	7.5	.060	.312	2020	16.6	1.3	12.6	39.9	28.9	38.5
8 25 PCT T	15.7	29.1	63	19.5	.808	5.3	.061	.491	2000	16.9	.9	1.0	5.9	8.9	7.2
9 C.T.	29.0	0.0	0	3.9	R	R	.051	R	2000	19.5	82.5	13.1	.1	3.1	0.0
1 IDLE	18.5	0.0	0	3.5	R	R	.064	R	600	15.2	19.5	79.1	.2	9.6	0.0
2 25 PCT T	15.7	29.1	63	19.6	.812	5.9	.061	.499	2000	16.9	2.9	1.2	5.1	8.5	7.2
3 55 PCT T	10.3	53.2	139	29.8	.560	9.9	.064	.341	2010	15.7	9.5	8.8	37.9	29.8	30.9
4 25 PCT T	15.7	29.1	63	19.7	.817	5.9	.061	.497	2000	16.9	1.9	.6	5.6	8.6	7.2
5 10 PCT T	17.9	10.0	27	19.7	1.968	3.9	.058	.893	1980	17.3	.6	.2	1.1	9.7	2.2
6 25 PCT T	15.7	29.1	63	19.8	.821	5.7	.061	999	2000	16.9	1.1	.6	5.9	8.6	7.2
8 25 PCT T	15.7	87.8	227	99.9	.511	8.0	.062	.311	2030	16.2	2.9	6.3	90.9	28.7	38.6
9 C.T.	29.0	0.0	0	3.7	R	R	.050	R	2000	20.0	72.1	7.5	.1	3.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 1.9 5 9.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 2.1 9 10.3

TWO CYCLE COMPOSITE -

HC- FID 0.35(1.9) + 0.65(2.1) = 2.093 G/KW HR (1.523 BS)

CO- NDIR 0.35(5.2) + 0.65(8.8) = 7.517 G/KW HR (5.605 BS)

NOX-CL 0.35(9.6) + 0.65(10.3) = 10.055 G/KW HR (7.498 BS)

HC + NOX = 12.097 G/KW HR (9.021 BS)

SFC = .919 KG/KW HR (.689 BS)

TABLE D-22. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-229 RUN-02 08-16-74 DI-TR-HEI NOVA-NOAI-19BTDC-1.99ROD+.25M1+9 K= 1.087 HUM= 15.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	720	.350	12.38	93	12.810	1592	10	85	2	.232	2.2	20	.9	0.0	950
2 25 PCT T	26	.025	13.35	980	13.378	8800	2	33	119	.077	.1	3	8.8	17.6	399
3 55 PCT T	22	.096	13.78	1915	13.828	13109	2	88	989	.197	.3	13	71.2	38.9	262
4 25 PCT T	19	.010	13.35	970	13.362	8669	1	13	110	.077	.1	1	8.5	17.6	399
5 10 PCT T	12	.005	12.65	180	12.656	6622	1	5	39	.057	.0	0	1.9	7.0	997
6 25 PCT T	11	.010	13.35	970	13.361	8669	1	13	110	.077	.1	1	8.5	17.6	396
7 90 PCT T	19	.159	13.93	1230	19.090	19822	2	951	625	.113	.3	51	70.6	69.6	36
8 25 PCT T	12	.010	13.49	510	13.501	8637	1	13	115	.077	.1	1	8.9	17.5	901
9 C.T.	19900	.275	8.81	17	10.696	1588	233	83	1	.193	33.3	12	.1	0.0	612
1 IDLE	1090	.927	12.79	97	13.839	1592	13	209	2	.232	3.0	48	.9	0.0	952
2 25 PCT T	84	.025	13.69	525	13.675	8759	6	33	121	.077	.5	3	9.3	18.0	901
3 55 PCT T	80	.131	19.23	1960	19.370	13972	8	298	999	.197	1.2	36	72.6	90.0	262
4 25 PCT T	96	.010	13.69	510	13.655	8618	3	13	116	.077	.3	1	8.9	18.1	901
5 10 PCT T	90	.005	13.07	230	13.079	6759	2	5	93	.057	.1	0	2.9	7.5	950
6 25 PCT T	37	.010	13.64	510	13.654	8528	3	13	115	.077	.2	1	8.9	17.9	901
7 90 PCT T	36	.109	13.93	1253	19.038	20099	6	299	696	.113	.7	34	73.0	65.0	36
8 25 PCT T	23	.010	13.69	520	13.653	8982	2	13	117	.077	.1	1	9.0	17.9	901
9 C.T.	16000	.337	8.92	11	10.987	1633	269	106	1	.193	38.5	15	.1	0.0	610

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.7	0.0	0	3.9	R	R	.058	R	600	17.2	6.2	19.5	.2	9.6	0.0
2 25 PCT T	15.7	23.5	63	19.9	.829	5.0	.060	.501	1950	16.6	.9	2.5	9.9	9.7	7.2
3 55 PCT T	10.3	52.2	139	28.9	.559	9.5	.062	.337	1970	16.1	.9	12.7	39.8	29.7	30.9
4 25 PCT T	15.7	23.5	63	19.1	.811	9.8	.060	.999	1950	16.6	.2	1.0	9.7	8.6	7.2
5 10 PCT T	17.6	9.9	24	19.6	1.553	3.7	.057	.999	1930	17.5	.1	.3	1.1	9.8	2.1
6 25 PCT T	15.6	23.6	63	19.1	.811	9.8	.060	.993	1950	16.6	.2	1.0	9.7	8.6	7.2
7 90 PCT T	1.9	84.7	228	93.7	.509	7.9	.063	.307	2000	15.8	.7	50.3	39.5	28.8	38.8
8 25 PCT T	15.8	23.5	64	19.6	.792	5.0	.061	.982	1990	16.5	.2	1.0	5.0	8.9	7.2
9 C.T.	29.1	0.0	0	3.5	R	R	.050	R	2000	20.1	91.1	11.7	.1	2.9	0.0
1 IDLE	17.8	0.0	0	3.9	R	R	.063	R	600	15.9	6.8	39.7	.2	9.5	0.0
2 25 PCT T	15.8	24.2	64	19.3	.798	5.1	.062	.985	2000	16.3	1.0	1.8	5.1	8.6	7.2
3 55 PCT T	10.3	53.6	139	29.7	.554	9.9	.065	.337	2020	15.5	2.8	26.1	39.3	25.2	30.6
4 25 PCT T	15.8	24.2	64	19.0	.785	9.9	.061	.977	2000	16.3	.6	.7	9.8	8.9	7.2
5 10 PCT T	17.7	10.1	27	19.9	1.982	9.9	.059	.902	1980	17.0	.3	.2	1.3	9.9	2.2
6 25 PCT T	15.8	24.0	64	18.8	.784	9.9	.061	.977	1980	16.3	.9	.7	9.8	8.3	7.2
7 90 PCT T	1.9	87.1	228	94.2	.507	7.6	.063	.309	2010	15.8	1.5	29.2	39.5	28.8	38.3
8 25 PCT T	15.8	24.0	64	18.7	.780	5.0	.061	.975	1980	16.3	.3	.7	9.9	8.3	7.2
9 C.T.	29.0	0.0	0	3.6	R	R	.049	R	2000	20.3	86.3	10.9	.0	3.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 2.0 6 9.7

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 2.9 7 9.9

TWO CYCLE COMPOSITE -

HC- FID 0.35(2.0) + 0.65(2.9) = 2.294 G/KW HR (1.675 BS)

CO- NDIR 0.35(5.5) + 0.65(7.5) = 6.776 G/KW HR (5.053 BS)

NOx-CL 0.35(9.7) + 0.65(9.9) = 9.822 G/KW HR (7.324 BS)

HC + NOX = 12.068 G/KW HR (8.999 BS)

SFC = .912 KG/KW HR (.677 BS)

TABLE D-23. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

ENGINE-2 TEST-229 RUN-03 1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
08-16-76 DI-TR-HEI RVA-NOAI-19BTDC-1.99ROD+.25M1+9 K= 1.075 HUM= 19.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1568	1.589	12.38	93	19.196	1592	19	350	2	.232	9.5	81	.9	0.0	970
2 25 PCT T	152	.109	13.99	1253	13.611	7711	10	119	253	.077	.7	9	19.5	18.0	939
3 55 PCT T	768	.239	13.69	2669	13.966	11798	73	906	801	.197	10.7	60	117.7	39.9	312
4 25 PCT T	58	.061	13.35	1230	13.918	7303	4	67	239	.077	.3	5	18.9	17.9	997
5 10 PCT T	16	.035	11.99	300	12.027	5307	1	32	97	.057	.0	2	2.7	6.9	995
6 25 PCT T	28	.061	13.35	1090	13.919	7399	2	68	209	.077	.1	5	15.7	18.0	999
7 90 PCT T	20	.227	13.93	1112	19.160	20957	3	669	573	.113	.4	75	69.8	66.0	38
8 25 PCT T	13	.035	13.35	1088	13.387	7257	1	39	210	.077	.1	3	16.2	17.8	999
9 C.T.	16960	.350	9.93	19	11.629	1588	252	96	1	.193	36.1	19	.1	0.0	615
1 IDLE	1972	1.137	12.65	52	13.953	1592	18	259	2	.232	9.3	59	.5	0.0	962
2 25 PCT T	100	.082	13.07	1183	13.169	7489	6	95	290	.077	.5	7	10.5	17.9	939
3 55 PCT T	800	.239	13.69	2861	13.969	11889	77	911	868	.197	11.3	60	127.6	39.2	302
4 25 PCT T	52	.061	13.21	1159	13.277	7303	3	68	227	.077	.2	5	17.5	17.6	999
5 10 PCT T	30	.096	11.99	210	12.039	5262	1	90	33	.057	.1	2	1.9	7.1	993
6 25 PCT T	38	.061	13.07	1049	13.136	7303	2	69	211	.077	.2	5	16.2	17.7	992
7 90 PCT T	32	.227	13.69	1183	13.871	20366	5	479	620	.113	.6	76	70.0	65.3	38
8 25 PCT T	26	.051	13.35	1069	13.909	7167	2	55	203	.077	.1	9	15.6	17.6	999
9 C.T.	17600	.969	9.22	21	11.607	1729	285	191	1	.193	90.7	20	.2	0.0	615

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- KW	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	18.5	0.0	0	3.9	R	R	.065	R	600	15.5	8.5	31.9	.2	5.0	0.0
2 25 PCT T	17.1	24.1	63	17.0	.705	10.7	.061	.929	2000	16.3	1.4	3.6	7.6	8.2	7.2
3 55 PCT T	12.3	52.9	139	25.9	.990	15.5	.063	.298	2000	15.9	20.2	23.5	96.1	29.0	30.2
4 25 PCT T	17.6	24.0	63	16.1	.671	10.2	.060	.908	1990	16.5	.5	2.0	7.2	7.8	7.2
5 10 PCT T	19.5	9.3	25	11.7	1.260	5.2	.055	.767	1990	18.3	.1	.7	1.1	9.2	2.1
6 25 PCT T	17.5	24.1	63	16.3	.676	8.7	.060	.911	2000	16.5	.3	2.1	6.2	7.9	7.2
7 90 PCT T	1.5	88.5	227	95.1	.509	6.6	.049	.310	2050	15.7	.7	39.5	25.3	32.1	38.9
8 25 PCT T	17.5	23.9	63	16.0	.670	9.0	.060	.908	1980	16.6	.1	1.2	6.3	7.8	7.2
9 C.T.	29.2	0.0	0	3.5	R	R	.059	R	2000	18.9	68.2	5.9	.1	3.1	0.0
1 IDLE	18.2	0.0	0	3.9	R	R	.063	R	600	15.8	2.3	29.5	.2	5.0	0.0
2 25 PCT T	17.3	24.0	63	16.5	.688	10.2	.059	.919	1990	16.8	.8	3.0	6.9	8.0	7.2
3 55 PCT T	11.9	52.6	139	26.2	.998	16.9	.063	.303	1990	15.9	19.5	25.2	97.6	29.2	30.9
4 25 PCT T	17.3	23.6	63	16.1	.682	9.8	.060	.915	1960	16.7	.9	2.2	6.5	7.8	7.1
5 10 PCT T	19.4	9.5	26	11.6	1.223	3.5	.055	.799	1950	18.3	.1	1.0	.7	9.2	2.1
6 25 PCT T	17.4	23.8	63	16.1	.678	9.1	.059	.912	1970	16.9	.3	2.2	6.1	7.8	7.2
7 90 PCT T	1.5	87.6	228	99.9	.513	7.3	.062	.312	2020	16.0	1.0	31.8	26.1	31.9	38.8
8 25 PCT T	17.5	23.6	63	15.8	.670	8.8	.060	.907	1960	16.6	.2	1.8	5.8	7.7	7.1
9 C.T.	29.2	0.0	0	3.8	R	R	.059	R	2000	18.9	70.2	8.9	.1	3.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 2.8 19 13.6
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 3.1 13 19.9

TWO CYCLE COMPOSITE -

HC- FID 0.35(2.8) + 0.65(3.1) = 3.016 G/KW HR (2.299 GS)
CO- NDIR 0.35(13.5) + 0.65(12.9) = 13.139 G/KW HR (9.799 GS)
NOX-CL 0.35(13.6) + 0.65(19.9) = 19.193 G/KW HR (10.596 GS)
HC + NOX = 17.159 G/KW HR (12.795 GS)
SFC = .378 KG/KW HR (.622 GS)

TABLE D-24. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-229 RUN-HOT 08-16-76 DI-TR-HEI NOVA-NOAI-19BTDC-1.99ROD K= 1.076 HUM= 15.0 G/KG

		CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				VAC.
MODE	RPM	HC-FID	CO	CO2	NOX-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOX-CL	CKW	MM
2	2000	100	.181	13.93	1869	19.123	20321	16	527	893	16.3	527	960.9	71.0	18
3	2000	70	.239	13.78	1765	19.027	20865	12	719	872	11.8	719	937.6	70.8	18

		-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------								---CALC---		-------G/KW HR-------			SFC
MODE	ID	MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	A/F	F/A	HC	CO	NOX	KG/KW HR
2		.7	95.3	250	99.8	.18	5.67	9.61	.970	15.7	.064	.23	7.40	12.89	.286
3		.7	99.9	299	96.0	.13	7.79	9.38	.985	15.8	.063	.17	10.37	12.58	.295

ID =

TABLE D-25. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-2 TEST-230 RUN-01 08-16-76 DI-TR-HFI AIXCT-NOVA-1.44ROO+.25BAM)+9 K= 1.078 HUM= 15.2 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	300	1.000	9.32	27	10.353	1478	5	327	2	.232	1.2	76	.9	0.0	980
2 25 PCT T	24	.056	10.19	990	10.244	8981	2	99	138	.077	.2	8	10.6	17.7	901
3 55 PCT T	10	.072	11.24	1207	11.313	13517	1	173	516	.147	.2	25	75.9	39.2	269
4 25 PCT T	8	.090	10.07	990	10.111	8890	1	72	138	.077	.1	6	10.7	17.8	901
5 10 PCT T	11	.090	9.22	160	9.262	6713	1	59	92	.057	.0	3	2.9	7.9	957
6 25 PCT T	8	.051	10.30	980	10.352	9026	1	90	150	.077	.1	7	11.5	17.8	399
7 90 PCT T	1	.035	11.86	1088	11.896	19913	0	120	652	.113	.0	14	73.7	65.1	38
8 25 PCT T	2	.035	10.30	930	10.336	8936	0	62	133	.077	.0	5	10.2	17.8	901
9 C.T.	16960	.337	9.49	18	11.830	1769	277	102	1	.193	39.6	15	.1	0.0	605
1 IDLE	280	.214	9.93	47	9.674	1769	6	88	3	.232	1.3	18	.7	0.0	972
2 25 PCT T	70	.061	10.19	930	10.259	8800	7	106	132	.077	.5	8	10.2	17.8	901
3 55 PCT T	40	.072	11.34	1230	11.436	13472	5	171	519	.147	.8	25	76.2	39.2	269
4 25 PCT T	30	.096	10.30	950	10.399	8759	3	78	136	.077	.2	6	10.5	17.7	901
5 10 PCT T	28	.090	9.32	155	9.369	6622	2	58	39	.057	.1	3	2.2	7.9	957
6 25 PCT T	22	.051	10.41	960	10.463	8981	2	88	141	.077	.2	7	10.9	17.8	399
7 90 PCT T	11	.090	11.99	1112	12.032	20003	2	136	662	.113	.2	15	74.8	65.1	38
8 25 PCT T	12	.090	10.41	990	10.452	8890	1	70	144	.077	.1	5	11.5	17.7	901
9 C.T.	16960	.337	9.49	18	11.830	1769	277	102	1	.193	39.6	15	.1	0.0	605

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	18.9	0.0	0	3.7	R	R	.098	R	600	21.0	3.0	98.2	.2	9.9	0.0
2 25 PCT T	15.8	23.8	63	19.8	.836	5.9	.097	.507	1980	21.9	.5	9.8	5.9	8.6	7.2
3 55 PCT T	10.9	52.6	138	29.8	.567	10.0	.051	.345	2000	.9	.5	16.1	38.8	29.8	30.3
4 25 PCT T	15.8	23.9	63	19.6	.821	5.9	.094	.499	1990	21.4	.1	3.5	5.5	8.5	7.2
5 10 PCT T	18.0	9.9	26	19.8	1.993	9.3	.092	.908	1970	23.5	.1	2.1	1.2	9.8	2.2
6 25 PCT T	15.7	23.9	63	19.9	.833	6.9	.097	.507	1990	21.2	.1	9.9	5.9	8.7	7.2
7 90 PCT T	1.5	87.3	224	93.9	.503	7.6	.059	.304	2030	18.5	.1	8.6	37.7	28.1	38.7
8 25 PCT T	15.8	23.9	63	19.7	.824	5.7	.097	.501	1990	21.2	.0	3.0	5.2	8.6	7.2
9 C.T.	23.8	0.0	0	3.9	R	R	.055	R	2000	18.1	95.4	9.2	.1	3.2	0.0
1 IDLE	18.6	0.0	0	3.9	R	R	.099	R	600	22.5	3.0	17.9	.9	5.1	0.0
2 25 PCT T	15.8	23.9	63	19.9	.812	5.6	.097	.499	1990	21.3	1.2	7.9	5.2	8.5	7.2
3 55 PCT T	10.9	52.4	138	29.7	.569	10.0	.052	.343	2000	19.2	1.8	29.3	38.7	29.7	30.3
4 25 PCT T	15.8	23.8	63	19.3	.812	5.8	.097	.499	1980	21.2	.5	5.8	5.3	8.4	7.2
5 10 PCT T	18.0	10.0	26	19.6	1.949	9.0	.093	.891	1980	23.9	.3	3.2	1.1	9.7	2.2
6 25 PCT T	15.7	23.9	63	19.8	.829	6.0	.098	.509	1990	20.9	.4	6.6	5.5	8.6	7.2
7 90 PCT T	1.5	87.9	224	99.1	.505	7.7	.055	.307	2030	18.3	.5	19.9	37.9	28.2	38.7
8 25 PCT T	15.8	23.7	63	19.6	.828	6.9	.098	.509	1970	21.0	.2	5.2	5.8	8.5	7.1
9 C.T.	23.8	0.0	0	3.9	R	R	.055	R	2000	18.1	92.1	19.1	.1	3.2	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 2.2 8 10.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 2.3 6 10.5

TWO CYCLE COMPOSITE -

HC- FID 0.35(2.2) + 0.65(2.3) = 2.270 G/KW HP (1.692 BS)

CO- NDIR 0.35(8.9) + 0.65(5.5) = 6.537 G/KW HP (9.875 BS)

NOX-CL 0.35(10.9) + 0.65(10.5) = 10.510 G/KW HP (7.837 BS)

HC + NOx = 12.779 G/KW HP (9.530 BS)

SFC = .921 KG/KW HR (.693 BS)

TABLE D-26. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-230 RUN-02 08-17-76 RUN 1 CONFIGURATION + VAC ADV K= 1.090 HUM= 16.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	152	.706	10.07	31	10.793	.1860	3	296	2	.232	.7	57	.9	0.0	990
2 25 PCT T	128	.093	9.22	800	9.327	7620	11	153	236	.077	.9	12	18.2	17.8	937
3 55 PCT T	129	.170	10.76	2230	10.999	12202	15	383	899	.197	2.2	56	132.2	39.1	302
4 25 PCT T	92	.093	9.43	900	9.533	7399	8	196	229	.077	.6	11	17.3	17.6	937
5 10 PCT T	108	.088	8.33	180	8.429	5529	8	117	93	.057	.4	7	2.5	7.1	990
6 25 PCT T	112	.093	9.32	710	9.425	7439	10	198	203	.077	.7	11	15.6	17.7	939
7 90 PCT T	6	.061	11.48	1088	11.592	19867	1	213	677	.113	.1	24	76.6	64.9	28
8 25 PCT T	92	.082	9.43	800	9.517	7303	9	128	222	.077	.3	10	17.1	17.5	939
9 C.T.	32000	1.589	8.92	26	13.505	1860	981	992	1	.193	68.8	69	.2	0.0	615
1 IDLE	990	.873	9.86	39	10.781	1860	8	309	2	.232	1.9	71	.5	0.0	985
2 25 PCT T	250	.109	9.43	800	9.560	7530	21	165	228	.077	1.6	13	17.6	17.7	937
3 55 PCT T	208	.115	10.76	2351	10.897	12066	25	256	962	.197	3.7	38	138.9	38.7	302
4 25 PCT T	199	.093	9.43	800	9.539	7398	12	195	223	.077	.9	11	17.2	17.5	937
5 10 PCT T	199	.088	8.23	160	8.334	5993	10	116	38	.057	.6	7	2.2	7.1	990
6 25 PCT T	199	.098	9.43	810	9.596	7420	13	159	234	.077	1.0	12	18.0	17.8	937
7 90 PCT T	32	.061	11.73	1112	11.795	19913	6	209	679	.113	.7	24	76.7	64.9	28
8 25 PCT T	65	.082	9.43	790	9.519	7399	5	129	222	.077	.4	10	17.1	17.5	939
9 C.T.	28800	1.077	8.42	21	12.630	1950	989	336	1	.193	69.2	98	.2	0.0	607

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	19.3	0.0	0	9.1	0	0	.099	0	600	20.2	.9	22.7	.2	5.9	0.0
2 25 PCT T	17.2	23.8	63	14.8	.705	10.1	.093	.929	1990	23.9	1.2	9.7	6.5	8.0	7.2
3 55 PCT T	11.9	52.5	138	24.9	.512	17.9	.050	.312	2000	20.0	3.0	22.9	97.2	29.9	30.9
4 25 PCT T	17.2	23.4	63	14.3	.691	9.7	.099	.920	1970	22.9	.8	9.5	6.2	7.8	7.2
5 10 PCT T	19.3	9.5	25	12.3	1.293	9.6	.039	.787	1970	25.9	.6	7.7	.9	9.3	2.1
6 25 PCT T	17.3	23.7	63	16.9	.692	8.7	.093	.921	1980	23.1	1.0	9.5	5.6	7.8	7.2
7 90 PCT T	1.1	87.0	225	93.8	.504	7.9	.052	.306	2030	19.1	.2	9.4	27.3	30.6	38.7
8 25 PCT T	17.3	23.5	63	14.1	.687	9.6	.099	.918	1960	22.9	.9	3.9	6.1	7.7	7.1
9 C.T.	29.2	0.0	0	9.1	0	0	.065	0	2000	15.9	92.0	25.1	.1	3.6	0.0
1 IDLE	19.1	0.0	0	9.1	0	0	.050	0	600	20.2	2.9	30.9	.2	5.9	0.0
2 25 PCT T	17.2	23.7	63	14.6	.700	9.8	.099	.926	1980	22.8	2.0	5.5	6.1	7.9	7.2
3 55 PCT T	11.9	52.0	138	26.6	.512	18.9	.050	.311	1980	20.1	4.7	16.2	98.1	29.1	30.2
4 25 PCT T	17.2	23.5	63	14.2	.690	9.6	.099	.920	1960	22.9	1.2	9.8	6.0	7.7	7.1
5 10 PCT T	19.3	9.5	25	12.0	1.268	9.1	.038	.771	1960	26.0	.7	2.8	.7	9.2	2.1
6 25 PCT T	17.2	23.8	63	16.8	.705	10.0	.099	.929	1990	22.9	1.2	5.3	6.3	8.0	7.3
7 90 PCT T	1.1	87.0	225	93.9	.509	7.9	.054	.307	2030	18.7	.8	10.2	26.7	30.6	38.9
8 25 PCT T	17.3	23.5	63	16.3	.694	9.6	.099	.922	1960	22.9	.5	9.3	5.9	7.7	7.1
9 C.T.	23.9	0.0	0	9.3	0	0	.060	0	2000	16.6	86.5	20.7	.1	3.8	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 9.0 13 15.0

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 9.3 13 15.5

TWO CYCLE COMPOSITE -

HC- FID 0.35(9.0) + 0.65(9.3) = 9.200 G/KW HR (3.132 G/B)

CO- NDIR 0.35(13.5) + 0.65(17.5) = 12.893 G/KW HR (9.577 G/B)

NOX-CL 0.35(15.0) + 0.65(15.5) = 15.319 G/KW HR (11.919 G/B)

HC + NOX = 19.5[illegible] G/KW HR (19.551 G/B)

SFC = .[illegible] KG/KW HR (.690 LB)

TABLE D-27. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-230 RUN-03 08-17-76 RUN 1 CONFIGURATION + 1250 NLRPM AT CT K= 1.087 HUM= 15.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON G/HR	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	98	.525	10.53	29	11.066	1819	2	179	2	.232	.9	90	.9	0.0	988
2 25 PCT T	26	.051	10.07	350	10.129	8890	2	90	111	.077	.2	7	8.5	17.7	399
3 55 PCT T	10	.062	11.24	1090	11.308	13381	1	159	999	.147	.2	23	65.3	39.1	262
4 25 PCT T	9	.090	10.07	380	10.111	8800	1	71	119	.077	.1	5	9.2	17.7	399
5 10 PCT T	12	.035	9.20	125	9.237	6532	1	51	32	.057	.1	3	1.8	7.3	457
6 25 PCT T	9	.090	10.19	370	10.231	8936	1	71	117	.077	.1	6	9.0	17.7	396
7 90 PCT T	0	.096	11.99	1069	12.036	19913	0	153	635	.113	0.0	17	71.8	69.5	28
8 25 PCT T	3	.030	10.07	390	10.101	8669	0	52	121	.077	.0	9	9.3	17.5	399
9 C.T.	140	.030	11.98	38	11.528	9359	7	23	5	.193	1.0	3	.7	0.0	523
1 IDLE	96	.159	9.64	92	9.809	2091	1	67	3	.232	.2	15	.7	0.0	975
2 25 PCT T	19	.090	10.30	380	10.392	8890	1	70	118	.077	.1	5	9.1	17.7	399
3 55 PCT T	7	.061	12.45	1088	12.712	13290	1	129	910	.147	.1	19	60.3	39.0	262
4 25 PCT T	7	.090	10.30	400	10.391	8800	1	70	123	.077	.1	5	9.5	17.8	396
5 10 PCT T	11	.030	9.43	195	9.961	6527	1	93	36	.057	.0	2	2.1	7.1	455
6 25 PCT T	10	.090	10.30	370	10.392	8800	1	70	119	.077	.1	5	8.7	17.8	399
7 90 PCT T	1	.096	11.99	1136	12.036	19958	0	153	680	.113	.0	17	76.8	66.0	28
8 25 PCT T	4	.025	10.19	420	10.214	8709	0	93	129	.077	.0	3	9.9	17.5	396
9 C.T.	80	.020	11.73	39	11.759	9359	3	15	5	.193	.5	2	.7	0.0	523

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CFQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 IDLE	19.2	0.0	0	9.0	P	P	.051	R	600	19.8	21.0	37.0	.2	5.0	0.0
2 25 PCT T	15.7	23.8	63	19.6	.824	9.7	.044	.501	1990	21.6	9.8	6.9	9.9	8.2	7.2
3 55 PCT T	10.3	52.5	138	29.5	.562	8.6	.051	.392	2000	19.9	9.8	21.9	37.1	23.6	30.9
4 25 PCT T	15.7	23.7	63	19.9	.818	5.1	.046	.498	1980	21.6	3.9	5.0	5.2	8.1	7.2
5 10 PCT T	18.0	9.8	26	19.9	1.965	3.3	.042	.891	1960	23.6	2.7	2.6	1.0	9.5	2.2
6 25 PCT T	15.6	23.7	63	19.7	.832	5.0	.047	.506	1980	21.9	3.9	5.0	5.1	8.2	7.2
7 90 PCT T	1.1	86.5	225	93.9	.508	7.9	.055	.309	2020	18.3	0.0	19.8	90.8	26.9	38.6
8 25 PCT T	15.7	23.9	63	19.1	.815	5.2	.046	.496	1960	21.7	1.1	9.7	5.3	8.0	7.1
9 C.T.	20.6	0.0	0	9.6	P	P	.052	R	2000	19.1	98.8	3.0	.9	7.5	0.0
1 IDLE	18.7	0.0	0	9.5	P	P	.045	R	600	22.3	21.0	20.9	.9	5.6	0.0
2 25 PCT T	15.7	23.7	63	19.6	.824	5.0	.047	.503	1980	21.2	8.8	7.1	5.1	8.2	7.2
3 55 PCT T	10.3	52.3	138	29.3	.560	8.0	.052	.391	1990	17.9	10.9	25.1	33.9	23.9	30.3
4 25 PCT T	15.6	23.8	63	19.9	.815	5.2	.047	.495	1990	21.2	9.9	7.1	5.3	8.1	7.2
5 10 PCT T	17.9	9.6	25	19.5	1.529	3.9	.043	.927	1970	23.1	9.1	3.2	1.2	9.5	2.1
6 25 PCT T	15.7	23.8	63	19.9	.819	5.0	.047	.495	1990	21.2	6.2	7.1	9.9	8.1	7.2
7 90 PCT T	1.1	87.2	226	94.0	.509	7.9	.055	.307	2030	18.3	1.8	22.8	93.2	26.9	38.8
8 25 PCT T	15.6	23.5	63	19.2	.816	5.6	.047	.497	1960	21.9	2.5	9.9	5.6	8.0	7.1
9 C.T.	20.4	0.0	0	9.6	P	P	.053	R	2000	18.7	90.7	2.8	.9	7.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .1 6 9.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .1 9 9.5

TWO CYCLE COMPOSITE -

HC- FID 0.35(.1) + 0.65(.1) = .077 G/KW HR (.057 G/HP HR)

CO- NDIR 0.35(5.9) + 0.65(9.1) = 9.693 G/KW HR (3.500 G/HP HR)

NOX-CL 0.35(9.9) + 0.65(9.5) = 9.509 G/KW HR (7.087 G/HP HR)

HC + NOX = 9.581 G/KW HR (7.144 G/HP HR)

SFC = .993 KG/KW HR (.728 LB/HP HR)

TABLE MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-230 RUN-03 08-17-76 RUN 1 CONFIGURATION + 1250 NLRPM AT CT K= 1.087 HUM= 15.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	98	.525	10.53	29	11.066	1819	2	174	2	.232	.9	90	.9	0.0	488
2 25 PCT T	26	.051	10.07	350	10.124	8890	2	90	111	.077	.2	7	8.5	17.7	399
3 55 PCT T	10	.047	11.24	1090	11.308	13381	1	159	994	.197	.2	23	65.3	39.1	262
4 25 PCT T	9	.090	10.07	380	10.111	8800	1	71	119	.077	.1	5	9.2	17.7	399
5 10 PCT T	12	.035	9.20	125	9.237	6532	1	51	32	.057	.1	3	1.8	7.3	457
6 25 PCT T	9	.090	10.19	370	10.231	8936	1	71	117	.077	.1	6	9.0	17.7	396
7 90 PCT T	0	.096	11.99	1069	12.036	19913	0	153	635	.113	0.0	17	71.8	44.5	28
8 25 PCT T	3	.030	10.07	390	10.101	8669	0	52	121	.077	.0	4	9.3	17.5	399
9 C.T.	160	.030	11.98	38	11.529	9359	7	23	5	.193	1.0	3	.7	0.0	523
1 IDLE	96	.159	9.69	92	9.809	2041	1	67	3	.232	.2	15	.7	0.0	475
2 25 PCT T	19	.090	10.30	380	10.392	8890	1	70	118	.077	.1	5	9.1	17.7	399
3 55 PCT T	7	.061	12.65	1088	12.712	13290	1	129	910	.197	.1	19	60.3	39.0	262
4 25 PCT T	7	.090	10.30	900	10.391	8800	1	70	123	.077	.1	5	9.5	17.8	396
5 10 PCT T	11	.030	9.93	195	9.961	6577	1	53	36	.057	.0	2	2.1	7.1	455
6 25 PCT T	10	.090	10.30	370	10.392	8800	1	70	119	.077	.1	5	8.7	17.8	399
7 90 PCT T	1	.096	11.99	1136	12.036	19958	0	153	680	.113	.0	17	76.8	45.0	28
8 25 PCT T	9	.025	10.19	920	10.216	8709	0	93	129	.077	.0	3	9.9	17.5	396
9 C.T.	80	.020	11.73	39	11.759	9359	3	15	5	.193	.5	2	.7	0.0	523

TABLE D-28. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-2 TEST-230 RUN-HOT 08-14-74 DI-TP-MFI AI-1.44ROD K= 1.082 HUM= 15.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	50	.090	12.25	1490	12.296	20638	9	137	936	9.3	137	1013.1	70.9	18
2	2000	80	.035	11.99	1589	12.039	20099	15	119	882	19.8	119	959.1	69.3	18
3	2000	2	.030	12.25	1505	12.281	20957	0	102	832	.9	102	900.8	69.9	18

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1		.7	99.4	298	45.5	.10	1.48	10.08	.482	18.0	.056	.13	1.98	13.51	.293
2		.7	92.9	299	44.2	.14	1.30	9.65	.476	18.3	.055	.22	1.75	12.99	.289
3		.7	93.7	296	45.1	.08	1.11	9.03	.481	18.0	.056	.01	1.98	12.11	.293

ID =

TABLE D-29. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-231 RUN-01 08-17-76 DT-TR-MFI -CT- IAI-NOVA-1.99ROD- 600NLRPM K= 1.090 HUM= 16.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	24880	.337	3.02	R	6.129	2132	969	237	1	969.1	237	1.0	0.0	607
2	2000	13760	.969	10.07	21	12.099	2087	262	149	1	261.5	149	1.3	0.0	605
3	2000	17600	1.870	9.69	21	13.957	2132	308	598	1	308.5	598	1.2	0.0	610
4	2000	11200	.350	9.86	23	11.936	1769	190	109	1	189.6	109	1.3	0.0	610

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.25	23.9	0.0	0	9.7	R	R	R	R	33.6	.030	R	R	R	R
2	0.25	23.8	0.0	0	9.6	R	R	R	R	17.9	.056	R	R	R	R
3	0.00	24.0	0.0	0	9.7	R	R	R	R	15.8	.063	R	R	R	R
4	0.50	24.0	0.0	0	3.9	R	R	R	R	18.9	.053	R	R	R	R

ID = BLEED AIR

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-231 RUN-02 08-17-76 DT-TR-MFI -CT- IAI-NOVA-1.99ROD-1700NLRPM K= 1.090 HUM= 16.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	90	.035	8.92	31	8.960	6219	3	53	8	3.2	53	8.2	0.0	967
2	2000	19	.018	11.73	89	11.792	6149	1	11	16	.8	11	16.9	0.0	962
3	2000	6	.005	12.52	89	12.524	5398	0	4	13	.3	4	13.9	0.0	998

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.25	18.9	0.0	0	13.7	R	R	R	R	25.7	.039	R	R	R	R
2	0.25	19.2	0.0	0	13.6	R	R	R	R	18.8	.053	R	R	R	R
3	0.00	19.6	0.0	0	11.9	R	R	R	R	17.7	.057	R	R	R	R

ID = BLEED AIR

TABLE D-30. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-231 RUN-03 08-17-76 DI-TR-HEI -CT- 1AI- WVA-1,99ROD- 600NLRPM K= 1.100 HUM= 17.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	35840	.209	1.69	15	5.591	1905	1259	192	2	1253.9	192	1.9	0.0	610
2	2000	28800	.915	7.15	23	10.697	1905	551	150	1	551.9	150	1.5	0.0	605
3	2000	91600	2.500	4.65	33	13.642	2091	674	754	2	674.1	754	1.8	0.0	612
4	2000	25600	.363	7.50	26	10.609	1769	457	122	1	457.9	122	1.6	0.0	605

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CIQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.25	24.0	0.0	0	9.2	R	R	R	R	36.7	.027	R	R	R	R
2	0.25	23.8	0.0	0	9.2	R	R	R	R	19.7	.051	R	R	R	R
3	0.00	24.1	0.0	0	9.5	R	R	R	R	14.9	.067	R	R	R	R
4	0.50	23.8	0.0	0	3.9	R	R	R	R	19.8	.050	R	R	R	R

ID = BLEED AIR

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-231 RUN-04 08-17-76 DI-TR-HEI -CT- 1AI- WVA-1,99ROD-1700NLRPM K= 1.100 HUM= 17.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	1600	.181	6.65	39	7.001	9309	105	225	8	109.7	225	8.8	0.0	523
2	2000	320	.109	10.91	52	10.599	9269	19	85	7	19.2	85	7.7	0.0	516
3	2000	21	.030	11.98	123	11.513	9672	1	25	17	.9	25	18.2	0.0	516
4	2000	880	.125	9.86	45	10.082	9218	90	106	6	90.2	104	6.9	0.0	513

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CIQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	0.25	20.4	0.0	0	9.5	R	R	R	R	30.7	.033	R	R	R	R
2	0.25	20.3	0.0	0	9.4	R	R	R	R	20.8	.048	R	R	R	R
3	0.00	20.3	0.0	0	10.3	R	R	R	R	14.1	.052	R	R	R	R
4	0.50	20.2	0.0	0	9.3	R	R	R	R	21.7	.044	R	R	R	R

ID = BLEED AIR

TABLE D-31. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-231 RUN-05 08-17-76 DI-TR-HEI -CT- NOAI- NVA-1.99ROD-NBA-DECEL K= 1.099 HUM= 16.6 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	90	.035	11.98	100	11.520	4536	2	28	13	1.7	28	14.3	0.0	516
2	2000	100	.056	11.29	68	11.307	4123	4	41	8	4.0	41	9.0	0.0	528
3	2000	2680	.251	10.53	42	11.010	3719	77	171	5	77.3	171	5.2	0.0	538
4	2000	3520	.363	9.86	33	10.668	3539	129	299	4	128.5	299	4.0	0.0	544
5	2000	5600	.915	9.43	29	10.456	3402	199	273	3	198.8	273	3.4	0.0	546

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	1700	20.3	0.0	0	10.0	R	R	R	R	14.1	.052	R	R	R	R
2	1600	20.8	0.0	0	9.1	R	R	R	R	14.4	.051	R	R	R	R
3	1500	21.2	0.0	0	8.2	R	R	R	R	14.4	.050	R	R	R	R
4	1400	21.4	0.0	0	7.8	R	R	R	R	20.5	.049	R	R	R	R
5	1300	21.5	0.0	0	7.5	R	R	R	R	20.7	.048	R	R	R	R

ID = NO LD. RPM

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-231 RUN-06 08-17-76 DI-TR-HEI -CT- NOAI-NOVA-1.99ROD-NBA-DECEL K= 1.099 HUM= 16.4 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	9	.005	12.25	78	12.256	5443	0	9	12	.9	9	12.6	0.0	493
2	2000	2	.005	12.25	45	12.255	5035	0	9	9	.1	9	9.7	0.0	505
3	2000	0	.005	12.12	42	12.125	9999	0	9	8	0.0	9	9.2	0.0	508
4	2000	1	.005	11.73	52	11.735	9672	0	9	7	.0	9	7.5	0.0	516
5	2000	90	.020	11.48	37	11.505	9359	2	15	5	1.7	15	5.1	0.0	524
6	2000	140	.072	9.86	31	9.999	9082	7	60	4	7.2	60	4.6	0.0	531
7	2000	1600	.214	9.84	20	10.251	3679	63	156	2	62.7	156	2.6	0.0	538
8	2000	3072	.251	9.81	17	9.595	3997	120	182	2	119.8	182	2.2	0.0	549

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	1700	19.9	0.0	0	12.0	R	R	R	R	18.0	.055	R	R	R	R
2	1600	19.9	0.0	0	11.1	R	R	R	R	18.0	.055	R	R	R	R
3	1500	20.0	0.0	0	10.9	R	R	R	R	18.2	.055	R	R	R	R
4	1400	20.3	0.0	0	10.3	R	R	R	R	18.8	.053	R	R	R	R
5	1300	20.7	0.0	0	9.4	R	R	R	R	19.1	.052	R	R	R	R
6	1200	20.9	0.0	0	9.0	R	R	R	R	22.0	.046	R	R	R	R
7	1100	21.2	0.0	0	8.1	R	R	R	R	21.3	.047	R	R	R	R
8	1000	21.4	0.0	0	7.6	R	R	R	R	22.6	.044	R	R	R	R

ID = NO LD. RPM

TABLE D-32. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-232 RUN-01 09-17-76 DI-TR-HEI-MEGR AIXCT-19RMVA-1.99RNOX1.5M7 K= 1.100 HUM= 17.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	169	.755	10.91	29	11.183	1819	3	247	2	.232	.7	57	.9	0.0	972
2 25 PCT T	86	.109	9.75	340	9.863	7756	7	165	98	.077	.6	13	7.5	17.9	396
3 55 PCT T	28	.125	11.29	850	11.368	11975	3	267	327	.197	.5	39	98.1	39.5	249
4 25 PCT T	57	.093	9.75	310	9.899	7666	5	196	88	.077	.4	11	6.8	17.9	389
5 10 PCT T	108	.082	8.33	198	8.429	5993	8	107	97	.057	.4	6	2.7	7.2	988
6 25 PCT T	82	.098	9.86	340	9.967	7938	7	158	99	.077	.5	12	7.6	17.9	389
7 90 PCT T	9	.010	13.07	800	13.080	19958	1	31	996	.113	.1	3	90.9	65.1	33
8 25 PCT T	33	.082	9.86	390	9.946	7893	3	132	99	.077	.2	10	7.6	17.9	389
9 C.T.	290	.090	11.98	35	11.597	9173	10	30	5	.193	1.9	9	.7	0.0	523
1 IDLE	38	.287	10.53	35	10.822	1860	1	100	2	.232	.2	23	.5	0.0	990
2 25 PCT T	65	.093	9.96	310	10.060	7897	6	147	88	.077	.4	11	6.8	18.0	391
3 55 PCT T	13	.082	11.98	520	11.564	13018	2	187	219	.147	.2	28	31.9	39.4	206
4 25 PCT T	51	.093	9.96	350	10.059	7756	4	145	99	.077	.3	11	7.6	18.0	386
5 10 PCT T	93	.082	8.42	200	8.512	5398	6	105	96	.057	.4	6	2.6	7.2	985
6 25 PCT T	77	.093	9.96	290	10.061	7802	7	144	82	.077	.5	11	6.3	18.0	386
7 90 PCT T	9	.010	12.93	780	12.990	20185	1	32	995	.113	.1	9	90.2	65.8	33
8 25 PCT T	32	.077	9.86	270	9.990	7620	3	119	76	.077	.2	9	5.8	17.8	391
9 C.T.	120	.030	11.98	37	11.529	9269	5	23	5	.193	.7	3	.7	0.0	523

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	18.6	0.0	0	9.0	R	R	.051	R	600	19.5	19.3	36.6	.3	5.9	0.0
2 25 PCT T	15.6	23.9	63	17.1	.716	9.2	.095	.436	1980	22.1	12.0	R.1	5.7	7.7	7.2
3 55 PCT T	9.6	52.9	139	26.9	.499	4.3	.052	.303	2000	19.3	10.1	25.0	36.5	22.7	30.9
4 25 PCT T	15.3	29.0	63	16.9	.703	9.R	.095	.428	1990	22.2	7.R	7.2	5.2	7.4	7.2
5 10 PCT T	19.2	9.6	26	12.0	1.245	5.0	.039	.257	1980	25.8	9.0	3.9	2.0	9.0	2.1
6 25 PCT T	15.3	29.0	63	17.5	.728	9.2	.096	.443	1990	21.9	11.6	7.8	5.8	7.9	7.2
7 90 PCT T	1.3	R7.3	227	99.0	.504	5.2	.059	.307	2020	17.0	1.6	2.2	38.3	29.1	30.6
8 25 PCT T	15.3	29.0	63	17.9	.729	9.2	.095	.491	1990	22.0	9.6	6.5	5.8	7.R	7.2
9 C.T.	20.6	0.0	0	9.2	R	R	.052	R	2000	19.1	28.9	2.7	.5	7.7	0.0
1 IDLE	19.3	0.0	0	9.1	R	R	.099	R	600	20.2	5.5	21.8	.5	5.9	0.0
2 25 PCT T	15.9	29.1	63	17.3	.717	3.7	.096	.436	2000	21.7	19.2	10.6	6.1	7.6	7.2
3 55 PCT T	8.1	52.9	139	28.7	.593	9.1	.053	.330	2000	19.0	7.9	25.9	28.1	29.1	30.2
4 25 PCT T	15.2	29.1	63	17.1	.709	9.2	.096	.432	2000	21.7	11.0	10.5	6.8	7.5	7.2
5 10 PCT T	19.1	9.4	26	11.9	1.237	9.9	.033	.252	1980	25.5	12.0	5.7	2.9	3.9	2.1
6 25 PCT T	15.2	29.1	63	17.2	.713	3.5	.096	.434	2000	21.7	16.7	10.6	5.6	7.6	7.2
7 90 PCT T	1.3	88.3	227	99.5	.509	5.2	.058	.307	2090	17.1	2.6	3.3	99.8	28.8	30.8
8 25 PCT T	15.9	23.9	63	16.8	.703	3.2	.095	.428	1980	22.0	6.8	R.6	5.2	7.9	7.2
9 C.T.	20.6	0.0	0	9.9	R	R	.052	R	2000	19.1	23.3	3.0	.6	7.7	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 R 7.1

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .2 6 6.0

TWO CYCLE COMPOSITE -

HC- FID 0.35(.3) + 0.65(.2) = .199 G/KW HR (.199 RS)

CO- NDIR 0.35(R.4) + 0.65(5.7) = 6.629 G/KW HR (9.939 RS)

NOX-CL 0.35(7.1) + 0.65(6.0) = 6.355 G/KW HR (9.739 RS)

HC + NOx = 6.599 G/KW HR (9.889 RS)

SFC = .911 KG/KW HR (.676 RS)

TABLE D-33. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-232 RUN-02 08-17-76 DI-TR-HEI-MEGR AIXCT-19BHVA-1.99RODX1.5M7 K= 1.089 HUM= 15.6 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	60	.343	10.88	32	11.259	1860	1	121	2	.232	.3	28	.9	0.0	990
2 25 PCT T	79	.109	9.75	270	9.862	7893	6	168	78	.077	.5	13	6.0	17.9	389
3 55 PCT T	29	.115	10.88	950	10.997	12292	3	259	392	.197	.9	38	50.3	39.6	249
4 25 PCT T	98	.109	9.53	270	9.639	7802	9	170	79	.077	.3	13	6.1	18.0	389
5 10 PCT T	98	.098	8.23	165	8.339	5398	7	129	36	.057	.9	7	2.1	7.2	985
6 25 PCT T	68	.109	9.53	265	9.647	7847	6	179	78	.077	.5	19	6.0	19.0	389
7 90 PCT T	1	.096	11.86	1230	11.906	19958	0	155	792	.113	.0	17	83.8	64.1	33
8 25 PCT T	26	.093	9.53	230	9.626	7939	2	195	69	.077	.2	11	9.9	17.7	391
9 C.T.	1888	.170	10.53	27	10.907	9082	78	128	9	.193	11.1	18	.5	0.0	523
1 IDLE	18	.093	11.98	39	11.575	1860	0	30	2	.232	.1	7	.5	0.0	990
2 25 PCT T	55	.109	9.75	270	9.860	7847	5	167	77	.077	.4	13	6.0	18.0	389
3 55 PCT T	21	.125	11.00	870	11.128	12297	3	279	395	.197	.9	91	50.7	39.6	241
4 25 PCT T	62	.115	9.53	205	9.651	7530	5	180	58	.077	.4	19	9.9	17.8	389
5 10 PCT T	129	.109	8.23	163	8.347	5398	9	135	38	.057	.5	8	2.2	7.2	985
6 25 PCT T	85	.115	9.69	280	9.769	7847	7	186	81	.077	.6	19	6.2	17.9	386
7 90 PCT T	1	.056	11.99	1230	12.096	20185	0	190	792	.113	.0	21	83.8	65.8	33
8 25 PCT T	26	.093	9.53	230	9.626	7939	2	195	69	.077	.2	11	9.9	17.7	389
9 C.T.	2309	.209	10.30	25	10.757	9037	95	155	3	.193	13.6	22	.5	0.0	523

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 IDLE	19.3	0.0	0	9.1	R	R	.051	R	600	19.5	1.9	17.5	.3	5.6	0.0
2 25 PCT T	15.3	29.0	43	17.9	.726	3.3	.045	.991	1990	22.2	3.6	8.1	3.7	7.9	7.2
3 55 PCT T	9.6	53.1	139	27.1	.510	6.6	.050	.310	2010	20.0	3.2	29.7	31.9	23.3	30.7
4 25 PCT T	15.3	29.1	43	17.2	.719	3.3	.044	.939	2000	22.6	2.9	8.1	3.8	7.7	7.3
5 10 PCT T	19.1	9.6	24	11.9	1.236	3.8	.038	.752	1980	26.0	2.9	9.6	1.3	9.0	2.2
6 25 PCT T	15.3	29.1	43	17.3	.717	3.3	.044	.936	2000	22.6	3.9	8.6	3.7	7.8	7.3
7 90 PCT T	1.3	86.0	227	44.0	.511	8.8	.054	.311	1990	18.5	.2	10.9	52.9	29.0	38.2
8 25 PCT T	15.9	23.8	63	16.9	.690	2.8	.044	.919	1970	22.7	1.2	7.0	3.1	7.9	7.2
9 C.T.	20.6	0.0	0	9.0	R	R	.050	R	2000	20.1	81.3	11.5	.3	7.5	0.0
1 IDLE	19.3	0.0	0	9.1	R	R	.053	R	600	19.0	.5	9.6	.3	5.6	0.0
2 25 PCT T	15.3	29.1	43	17.3	.717	3.3	.045	.936	2000	22.2	2.3	8.5	3.7	7.8	7.2
3 55 PCT T	9.5	53.1	139	27.0	.508	6.6	.051	.309	2010	19.7	2.3	27.0	31.8	23.2	30.9
4 25 PCT T	15.3	23.9	63	14.6	.696	2.5	.044	.923	1980	22.6	2.5	9.2	2.8	7.5	7.1
5 10 PCT T	19.1	9.6	24	11.9	1.236	9.0	.038	.752	1980	26.0	3.1	5.1	1.9	9.0	2.1
6 25 PCT T	15.2	29.0	43	17.3	.721	3.9	.045	.938	1990	22.9	3.6	9.9	3.9	7.8	7.2
7 90 PCT T	1.3	88.3	227	44.5	.504	8.6	.054	.307	2090	18.3	.1	19.2	52.7	29.9	38.8
8 25 PCT T	15.3	23.7	63	16.9	.691	2.8	.044	.921	1970	22.7	1.1	7.9	3.1	7.9	7.1
9 C.T.	20.6	0.0	0	8.9	R	R	.044	R	2000	20.3	89.6	19.6	.3	7.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .7 9 8.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 8 8.5

TWO CYCLE COMPOSITE -

HC- FID	0.35(.7) + 0.65(.9) =	.813	G/KW	HP	(.606	BS)
CO- NDIR	0.35(8.6) + 0.65(8.1) =	8.268	G/KW	HP	(6.165	BS)
NOX-CL	0.35(8.6) + 0.65(8.5) =	8.530	G/KW	HP	(6.361	BS)
	HC + NOX =	9.399	G/KW	HP	(6.968	BS)
	SFC =	.906	KG/KW	HP	(.668	BS)

TABLE D-34. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-125 RUN-02 08-27-76 DI-PL-HEI 25PCT NOAI-30BTDC K= 1.082 HUM= 15.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	290	.136	11.99	950	12.153	8301	18	188	182	18.2	188	110.9	17.5	389
2	2000	232	.120	12.79	1069	12.936	7756	16	195	212	15.6	195	229.1	17.5	917
3	2000	520	1.680	13.07	1069	19.809	8528	39	1959	203	39.0	1959	220.0	17.5	939

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	BFC KG/KW HR
1	1.91	15.3	23.5	62	18.3	.79	8.18	9.99	.779	18.1	.055	1.06	10.97	5.95	.479
2	1.99	16.9	23.5	62	17.1	.68	6.32	9.21	.727	17.1	.058	.91	8.97	12.35	.992
3	1.97	17.3	23.5	62	18.8	1.98	89.96	8.89	.800	19.9	.067	1.98	113.99	11.86	.987

ID = ROD SET

TABLE D-35. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-125 RUN-03 08-27-76 DI-PL-HEI 55PCT NOAI-29BTDC K= 1.082 HUM= 15.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	80	.153	10.76	920	10.922	13653	11	386	382	11.0	386	913.0	38.9	137
2	2000	156	.136	11.61	1230	11.764	12882	19	302	997	18.9	302	983.7	38.9	201
3	2000	929	.209	13.35	2932	13.602	12383	93	375	735	93.9	375	795.1	38.9	269
4	2000	960	1.097	13.99	2191	19.696	12791	95	1928	619	99.8	1928	669.3	38.9	287

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	BFC KG/KW HR
1	1.38	5.9	52.2	137	30.1	.22	7.58	7.99	.577	20.1	.050	.29	10.16	10.09	.351
2	1.91	7.9	52.2	137	28.9	.37	5.92	8.77	.595	18.7	.053	.50	7.93	11.76	.331
3	1.99	10.9	52.1	137	27.3	.85	7.36	19.91	.529	16.3	.061	1.19	9.87	19.33	.319
4	1.97	11.3	52.2	137	28.2	1.86	37.81	12.13	.591	15.8	.067	2.99	50.70	16.27	.329

ID = ROD SET

TABLE D-36. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-125 RUN-09 08-27-76 DI-PL-HEI 10PCT NOAI-30BTDC K= 1.089 HUM= 15.6 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	200	.159	10.69	188	10.821	6169	13	183	36	12.5	183	38.6	6.9	932
2	2000	192	.263	13.99	980	13.775	5625	9	217	65	8.8	217	70.5	6.9	500
3	2000	1328	3.120	12.12	305	15.392	6219	61	2595	91	61.2	2595	99.3	6.9	511
9	2000	3136	8.550	8.92	79	17.333	8079	169	8095	12	169.0	8095	93.2	6.9	511

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	1.91	17.0	9.2	29	13.6	1.39	20.29	3.95	1.975	20.3	.099	1.87	27.21	5.38	.897
2	1.99	19.7	9.2	29	12.9	.98	29.11	7.23	1.399	16.1	.062	1.32	32.33	9.78	.817
3	1.97	20.1	9.2	29	13.7	6.80	282.73	9.59	1.986	14.1	.071	9.12	379.19	6.09	.909
9	1.50	20.1	9.2	29	17.8	18.78	893.90	1.36	1.932	11.8	.085	25.18	1198.75	1.82	1.175

ID = ROD SET

TABLE D-37. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-125 RUN-05R 09-01-76 DI-TR-HEI 90PCT NOAI-19BTDC K= 1.109 HUM= 17.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2020	290	.115	12.79	1016	12.931	20190	92	360	525	91.8	360	580.2	61.2	30
2	2000	128	.125	14.23	1392	14.370	19731	20	398	635	19.9	398	700.8	60.6	79
3	2000	200	1.570	14.23	520	15.823	21863	32	9382	239	31.7	9382	263.9	60.7	89
9	2000	900	3.500	12.93	230	16.976	23859	67	10238	111	66.7	10238	122.1	60.7	81
5	2000	680	5.570	11.73	150	17.379	26036	118	16856	75	118.2	16856	82.9	60.7	79
6	2000	869	6.200	11.29	130	17.590	26308	150	18789	69	150.5	18789	75.9	60.8	69
7	2000	1168	7.210	10.53	138	17.876	28032	213	22839	72	213.2	22839	79.3	60.8	56
8	2000	1328	7.900	10.07	133	18.125	28576	299	25160	70	299.2	25160	76.9	60.8	51
9	2000	1152	7.810	10.30	188	18.299	28985	219	25063	99	213.7	25063	109.5	60.8	98

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	1.50	1.2	82.1	213	99.9	.52	9.96	6.50	.591	17.1	.058	.69	5.98	8.72	.329
2	1.56	2.9	81.3	213	93.5	.25	9.35	7.93	.535	15.5	.065	.33	5.83	10.69	.325
3	1.63	3.5	81.9	219	98.2	.90	59.78	2.98	.592	19.0	.072	.53	73.96	9.00	.360
9	1.69	3.2	81.9	219	52.6	.83	127.98	1.38	.696	13.2	.076	1.12	171.62	1.85	.393
5	1.75	2.9	81.9	219	57.9	1.98	210.70	.93	.705	12.3	.081	1.98	282.56	1.25	.929
6	1.81	2.7	81.5	219	58.0	1.88	239.81	.86	.712	12.1	.083	2.52	319.88	1.15	.933
7	1.88	2.2	81.5	219	61.8	2.67	285.98	.90	.758	11.8	.085	3.57	382.89	1.20	.961
8	1.94	2.0	81.5	219	63.0	3.05	319.50	.87	.773	11.5	.087	4.09	421.75	1.17	.970
9	2.00	1.9	81.6	219	63.9	2.67	313.29	1.29	.783	11.9	.087	3.58	420.13	1.66	.976

ID = ROD SET

TABLE D-38. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-125 RUN-06 08-27-76 DI-PL-HEI CT NOAI-14BTDC-600NL RPM K= 1.069 HUM= 14.1 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	25600	.997	8.81	22	12.087	1819	917	151	1	917.9	151	1.2	0.0	612
2	2000	28800	.995	9.43	31	13.531	2091	976	288	2	976.1	288	1.7	0.0	612
3	2000	89600	4.690	5.28	29	14.756	2676	1326	1283	1	1325.7	1283	1.1	0.0	610

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE Mv	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	BFC KG/KW HR
1	1.91	29.1	0.0	0	9.0	R	R	R	R	17.5	.057	R	R	R	R
2	1.99	29.1	0.0	0	9.5	R	R	R	R	15.6	.064	R	R	R	R
3	1.97	29.0	0.0	0	5.9	R	R	R	R	9.5	.105	R	R	R	R

ID = ROD SET

TABLE D-39. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-125 RUN-07 08-27-76 DI-PL-HEI CT-DEC NOAI-14BTDC RPM=NLRPM K= 1.069 HUM= 14.1 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	1900	880	.131	10.53	19	10.758	6809	61	167	9	61.1	167	9.2	19.6	927
2	1200	320	.030	13.07	98	13.136	3902	9	16	9	9.3	16	9.9	9.2	556
3	2000	1280	9.810	11.61	93	16.567	5806	52	3905	11	51.7	3905	11.5	15.9	526

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	BFC KG/KW HR
1	1.91	16.8	19.6	59	15.0	3.22	8.80	.21	.767	20.9	.049	9.32	11.80	.28	.967
2	1.99	21.9	12.9	59	7.5	.77	1.33	.34	.606	16.9	.059	1.09	1.78	.96	.369
3	1.97	20.7	20.6	59	12.8	2.58	170.25	.59	.621	13.0	.077	3.96	228.31	.73	.378

ID = ROD SET

TABLE D-40. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-126 RUN-02 08-30-76 DI-PL-HEI 25PCT WAI-30BTDC K= 1.090 HUM= 16.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	316	.109	9.12	350	9.263	8982	31	202	106	31.9	202	116.0	17.3	389
2	2000	272	.181	10.91	990	10.621	8210	23	283	291	23.1	283	263.1	17.3	934
3	2000	72	.613	11.98	990	12.101	9117	6	933	123	6.0	933	133.7	17.3	992

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	1.91	15.3	23.2	61	18.7	1.37	8.77	9.63	.807	23.5	.043	1.83	11.77	6.20	.491
2	1.99	17.1	23.2	61	18.1	1.00	12.30	10.99	.781	20.6	.049	1.35	16.58	19.07	.475
3	1.97	17.9	23.2	61	20.1	.26	90.57	5.33	.868	18.1	.055	.35	59.90	7.15	.528

ID = ROD SET

TABLE D-41. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-126 RUN-03 08-30-76 DI-PL-HEI 55PCT WAI-29BTDC K= 1.090 HUM= 16.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	180	.120	10.07	680	10.210	13381	26	310	296	25.8	310	322.7	38.9	175
2	2000	200	.125	11.00	1937	11.197	13063	26	297	559	25.8	297	609.7	38.9	296
3	2000	199	.153	11.61	1637	11.785	12837	23	337	592	23.9	337	695.6	38.5	269
4	2000	10	.251	12.93	1016	13.182	13971	1	538	357	1.2	538	389.8	38.5	282

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	1.38	6.9	51.5	135	29.5	.51	6.23	5.80	.572	21.9	.047	.68	8.35	7.78	.348
2	1.91	9.7	51.5	135	28.8	.51	5.82	10.96	.559	19.7	.051	.68	7.81	14.70	.340
3	1.99	10.9	51.6	135	28.3	.46	6.40	11.61	.548	18.7	.054	.62	8.85	15.57	.339
4	1.97	11.1	51.6	136	30.8	.02	10.59	7.01	.596	16.8	.060	.03	14.13	9.40	.363

ID = ROD SET

TABLE D-42. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-126 RUN-09 08-30-76 DI-PL-HEI 10PCT HAI-30BTDC K= 1.089 HUM= 15.7 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKH	VAC. MM
1	2000	916	.120	8.09	78	8.205	6713	37	198	21	36.6	198	23.0	6.8	929
2	2000	209	.098	9.12	325	9.290	6169	15	133	72	19.8	133	78.1	6.8	990
3	2000	88	.583	10.30	188	10.893	6668	6	721	38	5.9	721	41.9	6.8	513
9	2000	0	.376	14.08	75	14.455	8709	0	957	15	0.0	957	16.3	6.8	505

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	1.91	16.9	9.1	29	19.8	9.07	22.09	2.35	1,621	26.9	.038	5.95	29.55	3.16	.986
2	1.99	19.3	9.1	29	13.6	1.69	19.73	8.00	1,988	23.6	.042	2.20	19.75	10.73	.905
3	1.97	20.2	9.1	29	19.7	.66	80.19	9.25	1,609	20.1	.050	.88	107.97	5.69	.978
9	1.50	19.9	9.1	29	19.2	0.00	50.78	1.67	2,099	15.9	.065	0.00	68.09	2.29	1,277

ID = ROD SET

TABLE D-43. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-126 RUN-05R 09-01-76 DI-PL-HEI 90PCT HAI-19BTDC LESSTHAN 90PCT K= 1.109 HUM= 17.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKH	VAC. MM
1	2000	156	.722	13.93	1090	14.670	14777	29	1966	965	23.9	1966	519.1	60.9	28
2	2000	1792	3.980	12.79	1090	16.396	20366	256	8531	929	255.9	8531	973.7	60.9	91
3	2000	2128	5.570	11.98	530	17.296	21727	309	19139	221	309.5	19139	299.1	61.0	91
9	2000	2969	7.290	10.30	300	17.876	23996	377	19355	131	376.6	19355	199.'	60.9	89
5	2000	2898	8.890	9.32	170	18.993	29902	498	29096	76	497.9	29096	83.9	60.9	86
6	2000	3269	9.680	8.81	138	18.872	26263	532	27211	69	531.9	27211	70.9	60.9	79
7	2000	9352	9.990	8.92	123	18.919	27629	799	29969	60	793.6	29969	65.8	60.9	69

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	1.50	1.1	81.7	215	93.6	.30	29.58	5.82	.533	15.1	.066	.90	32.96	7.80	.329
2	1.56	3.6	81.7	215	99.9	3.20	106.69	5.36	.599	13.3	.075	9.29	193.00	7.19	.339
3	1.63	3.6	81.8	215	97.9	3.87	176.67	2.76	.586	12.3	.081	5.19	236.92	3.71	.356
9	1.69	3.5	81.7	215	51.8	9.71	241.99	1.69	.639	11.7	.085	6.31	329.99	2.19	.386
5	1.75	3.9	81.7	219	59.9	5.60	300.57	.95	.672	11.1	.090	7.51	903.08	1.27	.909
6	1.81	3.1	81.7	219	57.9	6.65	390.19	.80	.709	10.8	.093	8.92	956.19	1.07	.931
7	1.98	2.7	81.7	219	60.9	9.30	368.30	.75	.796	10.7	.099	12.97	993.90	1.00	.959

ID = ROD SET

TABLE D-44. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-127 RUN-01 09-01-76 DI-TR-MEI NOT WAI-19BTDC K= 1.095 HUM= 16.7 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	99	.159	11.99	1300	12.153	20321	8	536	722	8.2	536	790.3	61.7	18
2	2000	19	.115	13.07	1637	13.187	20957	3	359	893	3.3	359	923.3	65.5	18
3	2000	15	.216	19.23	1396	19.997	22181	3	669	686	2.6	669	751.3	68.9	18
4	2000	18	.997	14.59	968	15.039	22589	3	1508	983	3.1	1508	828.6	69.5	18
5	2000	90	.995	14.59	780	15.489	23587	7	2906	399	7.0	2906	931.8	69.5	18
6	2000	93	1.650	14.08	560	15.791	24086	16	5100	289	16.3	5100	311.5	69.5	18
7	2000	200	2.760	13.35	900	16.133	24993	36	8637	206	35.6	8637	225.3	69.9	18
8	2000	328	3.810	12.52	270	16.368	25991	60	12221	192	60.0	12221	155.9	68.6	18
9	2000	969	9.810	11.86	195	16.729	26990	85	15390	103	89.8	15390	112.3	68.3	18

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CIQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	1.50	.7	82.7	217	99.8	.10	6.61	8.91	.592	18.1	.055	.19	8.87	11.96	.330
2	1.56	.7	87.9	231	95.1	.09	9.17	9.80	.513	16.8	.060	.05	5.60	13.15	.312
3	1.63	.7	92.5	243	98.9	.03	7.39	7.58	.529	15.9	.065	.09	9.91	10.17	.322
4	1.69	.7	93.1	245	99.8	.03	16.57	5.30	.535	19.8	.060	.05	22.22	7.11	.326
5	1.75	.7	93.1	245	92.0	.08	31.93	4.33	.558	19.3	.070	.10	42.82	5.81	.340
6	1.81	.7	93.1	245	93.1	.18	56.09	3.13	.570	19.0	.071	.29	75.16	4.19	.347
7	1.88	.7	93.1	244	95.1	.39	99.91	2.26	.592	13.6	.074	.52	127.28	3.03	.360
8	1.94	.7	92.0	242	97.3	.67	135.79	1.58	.623	13.3	.075	.89	182.10	2.12	.379
9	2.00	.7	91.6	241	98.9	.95	171.96	1.15	.638	12.9	.078	1.27	230.60	1.59	.388

ID = ROD SET

TABLE D-45. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID MD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-127 RUN-02 09-01-76 DI-TR-HEI HOT NOAI-19BTDC K= 1.095 HUM= 16.7 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	320	.125	12.93	1323	13.080	17962	39	398	603	33.9	398	660.5	52.7	15
2	2000	270	.363	13.99	1637	13.877	19919	35	1025	760	39.7	1025	832.6	59.3	15
3	2000	296	.771	13.78	1960	14.585	20366	97	2175	677	96.9	2175	791.2	62.3	15
4	2000	372	1.290	13.78	1183	15.063	20502	58	3910	535	57.7	3910	585.4	63.5	15
5	2000	600	1.650	13.69	1088	15.358	20775	93	4508	484	92.6	4508	535.1	64.6	15
6	2000	1968	5.570	11.36	680	17.158	23909	317	15676	315	317.1	15676	399.9	70.0	15
7	2000	2176	6.800	10.53	910	17.582	25809	371	20163	200	370.6	20163	218.8	70.0	15
8	2000	2272	7.370	9.19	330	16.822	24036	906	23092	170	905.5	23092	185.7	69.8	15
9	2000	2932	7.900	9.69	295	17.823	24999	919	23678	121	919.9	23678	132.2	69.5	15

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOx	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOx	SFC KG/KW HR
1	1.50	.6	70.7	186	39.6	.99	5.09	8.79	.560	14.9	.059	.66	6.76	11.72	.391
2	1.56	.6	79.5	209	42.8	.95	13.22	9.81	.539	16.0	.063	.60	17.73	13.16	.328
3	1.63	.6	83.6	219	44.9	.58	26.68	8.31	.537	15.2	.066	.77	35.79	11.19	.327
4	1.69	.6	85.1	223	45.2	.69	41.09	6.99	.531	14.7	.068	.93	55.10	8.69	.323
5	1.75	.6	86.6	228	45.8	1.10	53.35	5.78	.529	14.9	.070	1.97	71.55	7.75	.322
6	1.81	.6	93.8	246	52.7	3.97	171.32	3.99	.562	12.9	.080	9.65	229.79	9.61	.392
7	1.88	.6	93.8	246	56.9	9.05	220.36	2.18	.607	12.0	.084	5.93	295.51	2.93	.369
8	1.94	.6	93.7	246	57.9	9.93	251.82	1.86	.613	12.9	.081	5.99	337.70	2.99	.373
9	2.00	.6	93.1	245	58.3	9.61	260.19	1.33	.626	11.6	.086	6.18	348.93	1.78	.381

ID = ROD SET

TABLE D-46. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HO ENGINE---PROJECT 11-4311

ENGINE-2 TEST-128 RUN-02 09-01-76 DI-PL-HEI NOAI CYL TO CYL A/F-198-1.97ROO K= 1.000 HUM= 1.0 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	1216	.210	13.69	960	13.987	0	0	0	0	0.0	0	0.0	17.9	378
2	2000	900	.170	13.78	290	13.995	0	0	0	0	0.0	0	0.0	17.9	378
3	2000	672	.159	13.93	555	14.165	0	0	0	0	0.0	0	0.0	17.9	378
4	2000	216	.115	13.93	900	14.069	0	0	0	0	0.0	0	0.0	17.9	378
5	2000	176	.192	14.08	580	14.292	0	0	0	0	0.0	0	0.0	17.9	378
6	2000	296	.169	14.23	980	14.428	0	0	0	0	0.0	0	0.0	17.9	378
7	2000	969	.170	13.78	520	14.097	0	0	0	0	0.0	0	0.0	17.9	378
8	2000	1829	.356	14.23	630	14.793	0	0	0	0	0.0	0	0.0	17.9	378

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- KV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	1	14.9	29.0	63	0.0	0.00	0.00	0.00	0.000	15.9	.063	0.00	0.00	0.00	0.000
2	2	14.9	29.0	63	0.0	0.00	0.00	0.00	0.000	15.9	.063	0.00	0.00	0.00	0.000
3	3	14.9	29.0	63	0.0	0.00	0.00	0.00	0.000	15.7	.064	0.00	0.00	0.00	0.000
4	4	14.9	29.0	63	0.0	0.00	0.00	0.00	0.000	15.8	.063	0.00	0.00	0.00	0.000
5	5	14.9	29.0	63	0.0	0.00	0.00	0.00	0.000	15.6	.064	0.00	0.00	0.00	0.000
6	6	14.9	29.0	63	0.0	0.00	0.00	0.00	0.000	15.4	.065	0.00	0.00	0.00	0.000
7	7	14.9	29.0	63	0.0	0.00	0.00	0.00	0.000	15.8	.063	0.00	0.00	0.00	0.000
8	8	14.9	29.0	63	0.0	0.00	0.00	0.00	0.000	15.0	.067	0.00	0.00	0.00	0.000

ID = CYLINDER

TABLE D-47. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-129 RUN-01 09-03-76 DI-PL-HEI NOEGR-NOAI-148 NOVA-1,99RODS+½A K= 1.097 HUM= 16.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	3109	5.210	10.91	99	16,977	1769	38	1238	2	.232	8.9	287	.9	0.0	975
2 25 PCT T	898	1.137	14.23	515	15,963	9163	57	1360	111	.077	9.9	105	8.6	17.3	399
3 55 PCT T	960	.838	14.23	1183	15,178	14787	107	1650	920	.197	15.7	293	61.7	38.0	296
4 25 PCT T	832	1.137	14.23	515	15,962	9616	59	1928	117	.077	9.6	110	9.0	17.3	396
5 10 PCT T	288	.583	14.59	265	15,156	7939	16	678	97	.057	.9	33	2.7	6.8	965
6 25 PCT T	816	1.137	14.23	510	15,960	9707	59	1992	117	.077	9.5	111	9.0	17.3	396
7 90 PCT T	8960	1.306	11.41	846	13,919	21097	1517	3988	966	.113	171.9	951	52.7	62.6	20
8 25 PCT T	880	1.289	14.23	520	15,619	9707	63	1612	118	.077	9.8	124	9.1	17.9	396
9 C.T.	49600	3.700	5.00	29	16,220	1819	891	836	1	.193	120.3	120	.1	0.0	630
1 IDLE	3680	4.130	10.07	51	16,423	1769	95	1318	2	.232	10.9	306	.5	0.0	975
2 25 PCT T	1152	1.077	14.23	510	15,938	9798	83	1381	118	.077	6.9	106	9.1	17.9	396
3 55 PCT T	1120	.821	14.23	1207	15,179	14878	125	1626	931	.197	18.9	239	63.3	38.1	299
4 25 PCT T	999	1.038	14.23	525	15,376	9616	67	1311	120	.077	5.2	101	9.2	17.3	396
5 10 PCT T	736	.983	14.70	256	15,221	7398	18	971	95	.057	1.1	27	2.6	6.8	965
6 25 PCT T	932	.972	14.23	520	15,297	9798	61	1258	121	.077	9.7	97	9.3	17.9	396
7 90 PCT T	10080	1.137	11.98	822	13,792	20775	1702	3971	953	.113	192.3	392	51.1	62.6	23
8 25 PCT T	880	1.000	14.23	520	15,331	9707	69	1279	120	.077	9.9	99	9.2	17.9	396
9 C.T.	70600	3.600	5.19	23	16,349	1819	849	807	1	.193	120.8	115	.1	0.0	630

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	HSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I		18.7	0.0	0	3.9	R	R	.078	R	600	12.8	2.6	18.2	.3	9.8	0.0
2 25		15.7	23.2	61	20.2	.870	9.8	.070	.529	2000	14.3	1.3	6.6	5.6	8.2	7.3
3 55		9.7	51.0	139	32.6	.640	8.3	.068	.389	2000	14.6	9.7	15.3	90.3	25.3	30.9
4 25		15.6	23.2	61	21.2	.912	9.1	.070	.555	2000	14.3	1.9	6.9	5.9	8.6	7.3
5 10		18.3	9.1	29	14.9	1.802	9.3	.068	1.096	2000	14.7	.3	2.1	1.8	9.9	2.1
6 25		15.4	23.3	61	21.9	.920	9.1	.070	.560	2000	14.3	1.3	7.0	5.9	8.7	7.3
7 90		.8	83.9	220	96.9	.553	9.6	.069	.336	2000	15.6	51.1	28.5	34.9	27.7	38.5
8 25		15.6	23.3	61	21.9	.919	9.1	.071	.559	2000	14.2	1.9	7.8	5.9	8.7	7.3
9 CT		29.8	0.0	0	9.0	R	R	.089	R	2000	11.9	35.9	7.6	.1	3.0	0.0
1 I		18.7	0.0	0	3.9	R	R	.079	R	600	12.7	2.9	20.6	.3	9.8	0.0
2 25		15.4	23.3	61	21.6	.928	9.1	.070	.569	2000	14.3	1.8	7.2	5.9	8.8	7.3
3 55		9.8	51.1	139	32.8	.642	8.5	.068	.391	2000	14.6	5.0	16.1	91.0	25.9	30.9
4 25		15.6	23.3	61	21.2	.911	9.2	.069	.559	2000	14.9	1.9	6.8	6.0	8.6	7.3
5 10		18.3	9.1	29	14.2	1.778	9.0	.068	1.082	2000	14.6	.3	1.8	1.7	9.9	2.1
6 25		15.6	23.3	61	21.6	.928	9.3	.069	.569	2000	14.5	1.3	6.5	6.0	8.8	7.3
7 90		.9	84.0	221	95.8	.595	9.5	.063	.332	2000	15.8	52.8	26.9	33.1	27.2	38.5
8 25		15.4	23.3	61	21.9	.919	9.2	.069	.559	2000	14.5	1.3	6.6	6.0	8.7	7.3
9 CT		29.8	0.0	0	9.0	R	R	.089	R	2000	11.9	33.2	7.8	.1	3.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 18.9 87 8.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 20.0 81 8.5

TWO CYCLE COMPOSITE = HC= FID 0.35(18.9) + 0.65(20.0) = 19.961 G/KW HR (14.512 GS)

CO= NDIR 0.35(87.0) + 0.65(81.9) = 83.385 G/KW HR (62.180 GS)

NOx=CL 0.35(8.9) + 0.65(8.5) = 8.647 G/KW HR (6.319 GS)

HC + NOx = 27.928 G/KW HR (20.826 GS)

SFC = .968 KG/KW HR (.769 GS)

ID =

TABLE D-48. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-129 RUN-02 09-03-76 DI-SAME AS RUN 1 EXCEPT BPEGR .53X7COIL K= 1.092 HUM= 16.9 G/KG

MODE		CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE		1989	3.030	9.17	92	12.371	1769	32	875	2	.232	7.3	203	.5	0.0	475
2 25 PCT T		912	1.137	13.35	285	14.590	10029	71	1577	71	.077	5.5	121	5.5	17.9	369
3 55 PCT T		832	.995	13.93	600	14.969	15785	100	2012	229	.197	19.7	296	33.7	38.3	152
4 25 PCT T		720	1.198	13.78	255	15.060	9939	59	1597	61	.077	4.2	123	4.7	17.9	368
5 10 PCT T		256	.492	14.23	178	14.756	7257	19	999	32	.057	.8	28	1.8	6.8	999
6 25 PCT T		768	1.178	13.93	265	15.195	9752	56	1527	62	.077	4.3	118	4.7	17.5	368
7 90 PCT T		980	1.057	13.69	1230	14.752	20321	75	2992	619	.113	8.5	332	69.9	63.0	20
8 25 PCT T		896	1.519	13.69	260	15.256	9798	66	1969	61	.077	5.1	151	4.7	17.5	368
9 C.T.		33920	3.810	9.19	21	11.591	1950	613	1295	1	.193	87.6	185	.2	0.0	630
1 IDLE		9229	6.530	7.29	30	14.286	1769	59	1693	1	.232	13.7	391	.3	0.0	955
2 25 PCT T		1399	1.587	13.45	260	15.092	9888	100	2103	62	.077	7.7	162	4.8	17.5	368
3 55 PCT T		1120	1.137	13.93	580	15.199	15921	139	2906	220	.197	19.7	359	32.9	38.3	152
4 25 PCT T		1109	1.589	13.78	255	15.995	9939	81	2058	59	.077	6.2	158	4.6	17.5	368
5 10 PCT T		592	1.038	13.93	180	14.036	7303	33	1019	32	.057	1.9	58	1.8	6.8	999
6 25 PCT T		1000	1.650	13.69	255	15.909	9888	73	2190	59	.077	5.6	165	4.6	17.5	368
7 90 PCT T		690	1.038	13.69	1300	14.751	20912	101	2982	652	.113	11.4	328	73.7	63.0	20
8 25 PCT T		976	1.650	13.69	255	15.901	9888	72	2190	59	.077	5.5	165	4.6	17.5	368
9 C.T.		72000	3.900	9.66	23	15.797	1905	933	828	1	.193	133.9	118	.1	0.0	630

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	HSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	0.0R	18.7	0.0	0	3.9	P	R	.058	R	600	17.3	5.3	13.0	.9	4.7	0.0
2 25	1.19	19.5	23.9	61	22.1	.996	3.1	.066	.575	2000	15.1	4.0	7.8	4.9	8.8	7.3
3 55	1.27	6.0	51.9	135	39.8	.678	4.5	.068	.917	2000	19.8	10.6	19.0	26.9	26.5	30.9
4 25	1.19	19.5	23.9	61	21.9	.937	2.7	.068	.570	2000	19.7	3.0	7.9	3.8	8.7	7.3
5 10	1.01	17.5	9.2	29	16.0	1.749	3.5	.066	1.069	2000	15.1	.6	1.8	1.9	4.7	2.1
6 25	1.19	19.5	23.9	61	21.5	.919	2.7	.069	.559	2000	19.6	3.1	7.5	3.8	8.6	7.3
7 90	0.11	.8	89.5	222	99.8	.630	7.9	.067	.323	2000	15.0	6.2	21.3	55.9	26.2	38.5
8 25	1.19	19.5	23.9	61	21.6	.923	2.6	.069	.561	2000	19.5	3.7	9.7	3.7	8.6	7.3
9 CT	0.0R	29.8	0.0	0	9.3	P	R	.058	R	2000	17.3	63.5	11.9	.1	3.2	0.0
1 I	0.0R	17.9	0.0	0	3.9	P	R	.069	R	600	19.5	6.7	20.2	.2	4.7	0.0
2 25	1.19	19.5	23.9	61	21.8	.931	2.7	.069	.567	2000	19.6	3.8	8.6	3.8	8.7	7.3
3 55	1.27	6.0	51.9	135	35.1	.683	4.9	.069	.915	2000	19.6	9.6	18.7	25.5	26.6	30.9
4 25	1.19	19.5	23.9	61	21.9	.936	2.6	.070	.569	2000	19.2	3.0	8.9	3.6	8.7	7.3
5 10	1.01	17.5	9.2	29	16.1	1.758	3.5	.068	1.069	2000	19.7	.9	3.1	1.9	4.7	2.1
6 25	1.19	19.5	23.9	62	21.8	.931	2.6	.070	.566	2000	19.3	2.8	8.7	3.6	8.7	7.3
7 90	0.11	.8	89.5	222	95.0	.632	7.9	.067	.329	2000	15.0	5.5	17.9	58.1	26.2	38.5
8 25	1.19	19.5	23.9	62	21.8	.931	2.6	.070	.566	2000	19.3	2.7	8.7	3.6	8.7	7.3
9 CT	0.0R	29.8	0.0	0	9.2	P	R	.082	R	2000	12.2	65.1	6.3	.1	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 7.6 86 6.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 11.3 109 7.0

TWO CYCLE COMPOSITE = HC= FID 0.35(7.6) + 0.65(11.3) = 9.980 G/KW HR (7.442 BS)

CO= NDIR 0.35(85.6) + 0.65(103.8) = 97.458 G/KW HR (72.679 BS)

NOX-CL 0.35(6.9) + 0.65(7.0) = 6.937 G/KW HR (5.173 BS)

HC + NOX = 16.917 G/KW HR (12.615 BS)

SFC = .974 KG/KW HR (.780 BS)

ID = INTAKE CO2

TABLE D-49. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE=1 TEST=129 RUN=03 09-03-76 DI-SAME AS RUN 02 EXCEPT WAIXCT K= 1.093 HUM= 16.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON G/HR	FUEL G/HR	CALCULATED HC	G/HR CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	988	1.240	9.22	17	10,519	1819	9	932	1	.232	2.1	100	.2	0.0	975
2 25 PCT T	109	.181	11.98	135	11,673	10160	10	319	93	.077	.8	25	3.3	17.9	368
3 55 PCT T	92	.170	12.52	910	12,700	16289	13	990	191	.197	1.9	65	28.0	38.3	152
4 25 PCT T	66	.109	11.61	150	11,726	9888	6	186	96	.077	.5	19	3.5	17.5	371
5 10 PCT T	49	.098	10.53	83	10,645	7303	5	135	21	.057	.3	8	1.2	6.8	999
6 25 PCT T	56	.115	11.61	150	11,731	9752	5	192	95	.077	.4	15	3.5	17.5	368
7 90 PCT T	92	.193	12.65	1112	12,898	20457	9	619	692	.113	1.0	70	72.6	63.2	20
8 25 PCT T	90	.098	11.61	155	11,712	9707	4	163	97	.077	.3	13	3.6	17.5	368
9 C.T.	72000	3.210	5.00	21	15,957	1950	997	793	1	.193	135.9	113	.1	0.0	630
1 IDLE	800	1.000	12.79	24	13,880	1478	11	299	1	.232	2.5	57	.3	0.0	975
2 25 PCT T	222	.159	11.61	148	11,799	9883	25	267	95	.077	1.9	21	3.9	17.5	371
3 55 PCT T	200	.197	12.52	935	12,690	16193	29	380	201	.197	4.2	56	29.6	38.9	152
4 25 PCT T	199	.109	11.61	155	11,735	9796	13	184	97	.077	1.0	19	3.6	17.5	368
5 10 PCT T	116	.093	10.53	90	10,636	7939	9	131	23	.057	.5	7	1.3	6.9	999
6 25 PCT T	108	.115	11.98	155	11,606	9752	10	199	97	.077	.8	15	3.6	17.5	368
7 90 PCT T	96	.193	12.79	1207	12,993	20568	17	615	692	.113	1.9	70	78.3	63.3	20
8 25 PCT T	88	.098	11.61	163	11,717	9707	8	163	99	.077	.6	13	3.8	17.6	368
9 C.T.	98000	2.250	6.65	24	13,229	1905	623	655	1	.193	89.2	99	.2	0.0	630

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CTC	FC	RSFC	RSNOX	SFC F/A	KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	0.08	18.7	0.0	0	9.0	R	R	.099	R	600	20.6	1.5	23.8	.2	9.7	0.0
2 25	1.19	19.5	23.9	61	22.9	.959	1.9	.053	.583	2000	19.8	.5	5.8	2.8	8.8	7.2
3 55	1.27	6.0	51.9	135	35.9	.699	3.8	.057	.925	2000	17.9	1.9	15.3	29.2	27.0	30.9
4 25	1.19	19.6	23.9	62	21.8	.931	2.0	.053	.566	2000	18.8	.3	3.9	3.0	8.6	7.3
5 10	1.01	17.5	9.2	29	16.1	1.756	2.3	.099	1.068	2000	20.6	.2	1.8	1.0	9.7	2.1
6 25	1.19	19.5	23.9	62	21.5	.917	2.0	.053	.558	2000	18.8	.3	3.5	3.0	8.5	7.3
7 90	0.11	.8	89.7	222	95.1	.533	7.7	.058	.329	2000	17.2	.7	14.6	68.5	26.1	38.5
8 25	1.19	19.5	23.5	62	21.9	.912	2.0	.053	.555	2000	18.8	.2	3.0	3.1	8.9	7.3
9 CT	0.08	29.9	0.0	0	9.3	P	R	.082	R	2000	12.2	99.9	26.8	.1	3.1	0.0
1 I	0.08	18.7	0.0	0	3.7	P	R	.063	R	600	15.9	2.5	16.9	.2	9.9	0.0
2 25	1.19	19.6	23.5	62	21.7	.929	1.9	.059	.562	2000	18.7	1.9	6.0	2.8	8.6	7.3
3 55	1.27	6.0	51.5	135	35.7	.693	4.0	.057	.921	2000	17.9	9.1	16.2	23.9	27.1	30.9
4 25	1.19	19.5	23.5	62	21.6	.920	2.0	.053	.559	2000	18.8	1.0	9.1	2.9	8.6	7.3
5 10	1.01	17.5	9.2	29	16.9	1.783	2.5	.099	1.084	2000	20.6	.5	2.2	1.0	9.8	2.1
6 25	1.19	19.5	23.5	62	21.5	.914	2.1	.053	.556	2000	19.0	.8	9.3	2.9	8.5	7.3
7 90	0.11	.8	89.8	223	95.4	.534	8.3	.059	.325	2000	17.0	1.9	20.1	63.0	26.9	38.5
8 25	1.19	19.5	23.5	62	21.9	.914	2.1	.053	.553	2000	18.8	.4	3.6	3.0	8.5	7.3
9 CT	0.08	29.8	0.0	0	9.2	P	R	.065	R	2000	15.9	86.9	27.1	.2	3.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 7.8 23 6.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 5.4 19 6.8

TWO CYCLE COMPOSITE = HC= FID 0.35(7.8) + 0.65(5.6) = 6.913 G/KW HR (9.782 BS)

CO= NDIR 0.35(23.2) + 0.65(19.0) = 20.965 G/KW HR (15.261 BS)

NOX-CL 0.35(6.9) + 0.65(6.8) = 6.844 G/KW HR (9.971 BS)

HC + NOx = 13.079 G/KW HR (9.753 BS)

SFC = .975 KG/KW HR (.781 BS)

ID = INTAKE CO2

TABLE D-50. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE=1 TEST=129 RUN=3XA 09-03-76 DI-RUN 03 WITH MODE 9 AT 1100NLRPM - R9N1 K= 1.095 HUM= 16.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	988	1.290	9.22	17	10.519	1819	9	932	1	.232	2.1	100	.2	0.0	975
2 25 PCT T	109	.181	11.98	135	11.673	10160	10	319	93	.077	.8	25	3.3	17.9	368
3 55 PCT T	92	.170	12.52	910	12.700	16289	13	990	191	.197	1.9	65	28.1	38.3	152
4 25 PCT T	66	.109	11.61	150	11.726	9888	6	186	96	.077	.5	19	3.5	17.5	371
5 10 PCT T	44	.098	10.53	83	10.635	7303	5	135	21	.057	.3	8	1.2	6.8	999
6 25 PCT T	56	.115	11.61	150	11.731	9752	5	192	95	.077	.4	15	3.5	17.5	368
7 90 PCT T	42	.193	12.65	1112	12.848	20957	9	619	699	.113	1.0	70	72.8	63.2	20
8 25 PCT T	90	.098	11.61	155	11.712	9707	9	163	97	.077	.3	13	3.6	17.5	368
9 C.T.	229	.061	8.92	35	8.505	3810	11	55	6	.193	1.5	8	.8	0.0	591
1 IDLE	800	1.000	12.79	28	13.880	1628	11	299	1	.232	2.5	57	.3	0.0	975
2 25 PCT T	272	.159	11.61	198	11.799	9893	25	267	95	.077	1.9	21	3.5	17.5	371
3 55 PCT T	200	.197	12.52	935	12.690	16193	29	380	202	.197	5.2	56	29.7	38.9	152
4 25 PCT T	139	.109	11.61	155	11.735	9798	13	189	97	.077	1.0	19	3.6	17.5	368
5 10 PCT T	114	.093	10.53	90	10.636	7939	9	131	23	.057	.5	7	1.3	6.9	999
6 25 PCT T	108	.115	11.48	155	11.606	9752	10	199	97	.077	.8	15	3.6	17.5	368
7 90 PCT T	96	.193	12.79	1207	12.993	20598	17	615	699	.113	1.9	70	78.9	63.3	20
8 25 PCT T	86	.098	11.61	163	11.717	9707	8	163	99	.077	.6	13	3.8	17.5	368
9 C.T.	229	.061	8.92	35	8.505	3810	11	55	6	.193	1.5	8	.8	0.0	591

MODE	ID	---UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CTO	FC	HSFC	HSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	PERCENT OF TOTAL HC	CO	NOX	FUEL	POWER
1 I		19.7	0.0	0	9.0	R	R	.099	R	600	20.6	29.1	31.7	.2	9.4	0.0
2 25		19.5	23.4	61	22.4	.959	1.9	.053	.583	2000	18.8	8.7	7.7	2.8	8.6	7.2
3 55		4.0	51.4	135	35.4	.699	3.8	.057	.925	2000	17.9	21.8	20.9	29.0	26.2	30.9
4 25		19.4	23.4	62	21.8	.931	2.0	.053	.566	2000	18.8	5.9	9.5	3.0	8.3	7.3
5 10		17.5	9.2	29	16.1	1.756	2.3	.099	1.068	2000	20.6	3.1	2.9	1.0	9.6	2.1
6 25		19.5	23.4	62	21.5	.917	2.0	.053	.558	2000	18.8	9.5	9.7	3.0	8.2	7.3
7 90		.8	89.3	222	95.1	.533	7.8	.058	.329	2000	17.2	11.8	22.1	62.2	25.3	38.5
8 25		19.5	23.5	62	21.9	.912	2.0	.053	.555	2000	18.8	3.2	9.0	3.1	8.2	7.3
9 CT		21.3	0.0	0	8.9	R	R	.039	R	1100	25.5	17.9	2.5	.7	6.0	0.0
1 I		18.7	0.0	0	3.7	R	R	.063	R	600	15.9	16.8	21.8	.2	9.3	0.0
2 25		19.6	23.5	62	21.7	.929	2.0	.059	.562	2000	18.7	12.9	7.9	2.8	8.9	7.3
3 55		4.0	51.5	135	35.7	.693	4.0	.057	.921	2000	17.9	27.9	21.5	23.7	26.2	30.9
4 25		19.5	23.5	62	21.6	.920	2.0	.053	.559	2000	18.8	6.8	5.5	2.9	8.3	7.3
5 10		17.5	9.2	29	16.9	1.783	2.5	.099	1.089	2000	20.6	3.9	2.9	1.0	9.7	2.1
6 25		19.5	23.5	62	21.5	.919	2.1	.053	.556	2000	19.0	5.1	5.8	2.9	8.3	7.3
7 90		.8	89.8	227	95.1	.539	8.9	.059	.325	2000	17.0	12.8	26.8	62.7	25.6	38.5
8 25		19.5	23.5	62	21.9	.909	2.1	.053	.553	2000	18.8	9.0	9.8	3.0	8.2	7.3
9 CT		21.3	0.0	0	8.9	R	R	.039	R	1100	25.5	10.3	3.1	.7	6.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------				.5	17	6.9
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------				.8	19	6.9
TWO CYCLE COMPOSITE =	HC= FID	0.35(.5) + 0.65(.8) =	.708	G/KW HR	(.528 BS)	
	CO= NDIR	0.35(17.9) + 0.65(19.3) =	15.377	G/KW HR	(11.467 BS)	
	NOX=CL	0.35(6.9) + 0.65(6.9) =	6.917	G/KW HR	(5.009 BS)	
		HC + NOX =	7.625	G/KW HR	(5.537 BS)	
		SFC =	.990	KG/KW HR	(.805 BS)	

ID =

TABLE D-51. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-1 TEST-129 RUN-3X8 09-03-76 DI-RUN 03 WITH MODES 7+9 INSERTED-RSM3+9M1 K= 1.095 HUM= 16.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	988	1.290	9.22	17	10.519	1819	9	932	1	.232	2.1	100	.2	0.0	975
2 25 PCT T	109	.181	11.98	135	11.673	10160	10	319	93	.077	.8	25	3.3	17.9	368
3 55 PCT T	92	.170	12.52	910	12.700	16289	13	990	191	.197	1.9	65	28.1	38.3	152
9 25 PCT T	66	.109	11.61	150	11.726	9888	6	196	96	.077	.5	19	3.5	17.5	371
5 10 PCT T	69	.098	10.53	83	10.635	7303	5	135	21	.057	.3	8	1.2	6.8	999
6 25 PCT T	56	.115	11.61	150	11.731	9752	5	192	95	.077	.9	15	3.5	17.5	368
7 90 PCT T	88	.325	19.86	510	15.195	21818	19	992	266	.113	1.6	106	30.1	63.5	93
8 25 PCT T	90	.098	11.61	155	11.712	9707	9	163	97	.077	.3	13	3.6	17.5	368
9 C.T.	229	.061	8.92	35	8.505	3810	11	55	6	.193	1.5	8	.8	0.0	591
1 IDLE	800	1.000	12.79	28	13.880	1678	11	299	1	.232	2.5	57	.3	0.0	975
2 25 PCT T	272	.159	11.61	198	11.799	9893	25	267	95	.077	1.9	21	3.5	17.5	371
3 55 PCT T	200	.197	12.52	935	12.690	16193	29	380	202	.197	9.2	56	29.7	38.9	152
9 25 PCT T	199	.109	11.61	155	11.735	9798	13	189	97	.077	1.0	19	3.6	17.5	368
5 10 PCT T	116	.093	10.53	90	10.636	7939	9	131	23	.057	.5	7	1.3	6.9	999
6 25 PCT T	108	.115	11.98	155	11.606	9752	10	199	97	.077	.8	15	3.6	17.5	368
7 90 PCT T	88	.325	19.86	510	15.195	21818	19	992	266	.113	1.6	106	30.1	63.5	93
8 25 PCT T	86	.098	11.61	163	11.717	9707	8	163	99	.077	.6	13	3.8	17.5	368
9 C.T.	229	.061	8.92	35	8.505	3810	11	55	6	.193	1.5	8	.8	0.0	591

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
9		18.7	0.0	0	9.0	R	R	.099	R	600	20.6	22.7	28.9	.3	9.5	0.0
1		19.5	23.9	61	22.9	.959	1.9	.053	.583	2000	18.8	8.2	6.9	9.9	8.9	7.2
3	55	6.0	51.9	135	35.9	.699	3.8	.057	.925	2000	17.9	20.5	18.3	37.8	25.8	30.3
9	25	19.6	23.9	62	21.8	.931	2.0	.053	.566	2000	18.8	5.0	9.1	9.8	8.2	7.2
5	10	17.5	9.2	29	16.1	1.756	2.3	.099	1.068	2000	20.6	2.9	2.2	1.6	9.5	2.1
6	25	19.5	23.9	62	21.5	.917	2.0	.053	.558	2000	18.8	9.2	9.2	9.7	8.1	7.2
7	90	1.7	85.2	229	98.1	.569	3.2	.068	.393	2000	19.7	17.2	30.1	90.5	26.6	38.6
8	25	19.5	23.5	62	21.9	.912	2.0	.053	.555	2000	18.8	3.0	3.6	9.8	8.1	7.3
9	CT	21.3	0.0	0	8.9	R	R	.039	R	1100	25.5	14.9	2.2	1.1	5.9	0.0
1	I	18.7	0.0	0	3.7	R	R	.063	R	600	15.9	17.2	19.1	.9	9.2	0.0
2	25	19.6	23.5	62	21.7	.929	2.0	.059	.562	2000	18.7	13.1	6.9	9.5	8.2	7.2
3	55	6.0	51.5	135	35.7	.693	9.0	.057	.921	2000	17.9	28.9	18.8	38.7	25.8	30.3
9	25	19.5	23.5	62	21.6	.920	2.0	.053	.559	2000	18.8	7.0	9.8	9.7	8.2	7.2
5	10	17.5	9.2	29	16.9	1.783	2.5	.099	1.089	2000	20.6	3.9	2.5	1.7	9.6	2.1
6	25	19.5	23.5	62	21.5	.919	2.1	.053	.556	2000	19.0	5.2	5.0	9.8	8.1	7.3
7	90	1.7	85.2	229	98.1	.569	3.2	.068	.393	2000	19.7	11.0	35.9	39.2	26.8	38.6
8	25	19.5	23.5	62	21.9	.909	2.1	.053	.553	2000	18.8	9.1	9.2	9.9	8.1	7.3
9	CT	21.3	0.0	0	8.9	R	R	.039	R	1100	25.5	10.5	2.7	1.1	5.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .5 19 9.1

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .8 16 9.2

TWO CYCLE COMPOSITE -

HC- FID	0.35(.5) + 0.65(.8) =	.709	G/KW	HR	(.529	88)
CO- NDIR	0.35(19.9) + 0.65(16.3) =	17.399	G/KW	HR	(12.971	88)
NOX-CL	0.35(9.1) + 0.65(9.2) =	9.170	G/KW	HR	(3.109	88)
	HC + NOX =	9.878	G/KW	HR	(3.638	88)
	SFC =	.997	KG/KW	HR	(.816	88)

ID =

APPENDIX E

ELECTRONIC FUEL INJECTION EVALUATIONS

E-1 Summary of the Results
E-2 through E-71 Computer Printouts

TABLE E-1. FUEL INJECTION EVALUATIONS - ENGINE 2

Test No.	Run No.	Type Test	Description	Gram/kW Hr HC	CO	NO_x	$HC+NO_x$	Kg/ kW-hr SFC	Appendix Table
213	1	9-EPA	Carb. 6606, Port Liners W/O Air	5.173	29.058	12.305	17.478	.464	C-32
	2		Carb. 6606, Port Liners W/O Air	5.163	30.643	12.009	17.172	.465	C-33
	3		Carb. 6606, Port Liners, With Air	11.681	16.102	10.689	22.370	.464	C-34
	4		Carb. 6606, Port Liners With Air X-CT	2.777	15.595	11.328	14.105	.460	C-35
	1 & 2	WOT	Carb. 6606, Port Liners W/O Air	4.94	252.68	5.44	10.38	.369	C-36
	3 & 4	WOT	Carb. 6606, Port Liners With Air	0.79	118.83	4.27	5.06	.362	C-36
214	1	9-EPA	Fuel Inj. ECU at 250, Std. Tim, PL W/O Air	8.639	62.938	8.390	17.029	.448	E-2
	2		Fuel Inj. ECU at 250, Std. Tim, PL W/O Air	7.273	45.319	8.948	16.220	.442	E-3
	3		Fuel Inj. ECU at 350, Std. Tim, PL W/O Air	6.107	88.930	8.467	14.574	.453	E-4
	4		Fuel Inj. ECU at 150, Std. Tim, PL W/O Air	7.673	12.932	8.954	16.627	.472	E-5
215	11-14	S.S.	Fuel Inj. Air/Fuel Cyl to Cyl Checks at Various Power Settings						E-6 & E-7
215	1-6	S.S.	Modal Fuel Inj. Evaluations at Various ECU Settings						E-8 - E-11
215	X	9-EPA	Fuel Inj. - Modes Selected for Best BSFC	1.271	15.897	12.027	13.298	.435	E-12
EGR	1-15	S.S.	Modal Evaluations with Manual EGR						E-31 - E-21
216	1	9-EPA	HEI - 14BTDC at 2000, 250 ECU, PL W/O Air	5.265	66.411	8.262	13.527	.450	E-22
	2		Same Conf. as Run 1 + Vac. Adv.	6.266	77.160	12.526	18.791	.406	E-23
217	1	9-EPA	Modally Optimized EFI-HEI-WVA-EGR-PL W/Air	1.219	34.517	4.754	5.973	.392	E-24
	3			1.499	20.421	6.179	7.678	.386	E-25
	5			1.240	36.347	5.189	6.430	.399	E-26
217	1, 3 & 5	S.S.	Air/Fuel Ratio Check for Test 217						E-27 & E-28
218	1	9-EPA	Modally Opt. EFI-HEI WVA-EGR-PL W/Air, 1700 NLRPM	1.325	31.783	5.406	6.731	.427	E-29
	2			1.254	36.292	5.671	6.924	.429	E-30
218	1 & 2	S.S.	Air/Fuel Ratio Check for Test 218						E-31
233	1	9-EPA	EFI-TR-HEI NOAI-14BTDC-250 ECU x Old Hookup	5.162	73.651	9.167	14.329	.433	E-32
	2		570 ECU x New Hookup	4.715	76.652	8.481	13.196	.428	E-33
	3			4.102	74.008	8.380	12.481	.440	E-34
	4		Same Conf. as Run 2 but WAIXCT	2.491	16.389	8.335	10.826	.445	E-35
	1, 2 & 3	WOT		3.14	223.71	1.30	4.44	.371	E-36
	4	WOT		1.76	214.74	1.28	3.04	.372	E-36

TABLE E-1 (Cont'd.) FUEL INJECTION EVALUATIONS - ENGINE 2

Test No.	Run No.	Type Test	Description	Gram/kW Hr HC	CO	NO_x	HC+NO_x	Kg/kW Hr SFC	Appendix Table
234	1	9-EPA	EFI-TR-HEI NOAI-14BTDC-Equiv. ECU as Test 215	0.967	17.408	12.697	13.664	.415	E-37
	2		Same Conf. as Run 1 but WAI	0.114	2.701	13.786	13.900	.413	E-38
235	1A	S.S.	EFI Cyl. to Cyl. Air/Fuel Check - ECU 470						E-39
	1B		EFI Cyl. to Cyl. Air/Fuel Check - ECU 625						E-40
	2		EFI A/F Check - ECU 625 - Lean Inj. in Cyl. 2&4						E-41
237	1R	9-EPA	EFI-TR-HEI WAIXCT-14B-570 ECU-BPEGR	0.899	67.456	5.013	5.912	.460	E-42
	2R		WVA .531-7C	1.036	70.027	9.784	10.820	.414	E-43
	1X		Run 01R with Inserted Mode 7	0.379	6.107	6.853	7.232	.437	E-44
	2X		Run 02R with Inserted Mode 7	0.541	10.522	11.628	12.168	.391	E-45
239	1-6	S.S.	EFI-TR-HEI NOAI-14BTDC at Various Power Modes					E-46 - E-48	
239	X	9-EPA	EFI-TR-HEI Modal NOAI - 14 BTDC	0.308	5.906	9.360	9.668	.416	E-49
240	1-5	S.S.	EFI-TR-HEI NOAI - Lean Optimization Evaluations					E-50 - E-52	
240	X	9-EPA	EFI-TR-HEI Modal NOAI MVA14, 24, 30-ECU-ID	0.310	6.940	9.395	9.705	.388	E-53
	XDC		EFI-TR-HEI Modal NOAI MVA CT 1350 NLRPM	0.601	7.825	9.415	10.017	.417	E-54
241	1	S.S.	Effect of Injection Timing EFI-TR-HEI WAI						E-55
	2		Effect of Injection Timing EFI-TR-HEI WAI						E-56
243	1	9-EPA	EFI-TR-HEI-MEGR.53 WAI-16B WVA	0.216	6.952	4.579	4.795	.395	E-57
	2		EFI-TR-HEI-MEGR.53 WAI-16B WVA	0.267	8.832	3.938	4.204	.395	E-58
	3		EFI-TR-HEI-MEGR.53 WAI-16B WVA	0.279	13.595	3.882	4.161	.389	E-59
244	1	S.S.	EFI-TR-HEI 14B-NOAI Effect of A/F at WOT						E-60
	2		EFI-TR-HEI 14B-NOAI-WEGR Effect of A/F-WOT						E-61
	3		EFI-TR-HEI NOAI-14B-MAXEGR.53XMI 90 Pct						E-62
	4		EFI-TR-HEI NOAI-14, 16, 18, 20B-MAXEGR.53 90						E-63
	5		EFI-TR-HEI NOAI-14B-Effect of A/F 55 Pct						E-64
	6		EFI-TR-HEI NOAI-14B-Effect of A/F 25 Pct						E-65
	7		EFI-TR-HEI NOAI-14B-Effect of A/F 10 Pct						E-66
	8		EFI-TR-HEI NOAI-24B-MAXEGR.53 55 Pct						E-67
	9		EFI-TR-HEI NOAI-30B-MAXEGR.53 25 Pct						E-68
245	1R	S.S.	EFI-TR-HEI NOAI-MAXEGR.53-335 to 305 ECU						E-69
	2R		EFI-TR-HEI NOAI-MAXEGR.53-265 to 255 ECU						E-70
	3R		EFI-TR-HEI NOAI-MAXEGR.53-150 to 175 ECU						E-71

TABLE E-2. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-2 TEST-219 RUN-1 06-19-76 FUEL INJ PUT AT 250 STD TIM PI WO AIR K= 1.069 HUM= 19.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1920	.312	13.69	65	19.112	1905	22	85	3	.232	5.0	20	.7	0.0	999
2 25 PCT T	115	.930	12.93	3[illegible]	13.823	10029	9	1357	28	.077	.7	105	4.0	17.7	320
3 55 PCT T	180	.120	13.35	1069	13.490	19970	22	240	905	.197	3.2	38	59.5	39.1	188
4 25 PCT T	95	.665	12.93	380	13.600	10115	9	999	100	.077	.3	77	7.7	18.0	317
5 10 PCT T	30	.957	12.12	130	12.580	8165	2	599	30	.057	.1	34	1.7	6.9	378
6 25 PCT T	30	.613	13.07	375	13.686	10251	3	927	100	.077	.2	71	7.7	19.2	315
7 90 PCT T	2060	2.290	13.35	1392	15.876	20956	311	6104	652	.113	35.2	690	73.7	65.0	81
8 25 PCT T	95	.957	13.07	910	13.532	10206	9	696	110	.077	.3	54	8.5	19.2	315
9 C.T.	98490	.201	.23	8	5.319	862	792	66	8	.193	113.2	9	.1	0.0	607
1 IDLE	1560	.210	13.35	56	13.735	1628	21	52	2	.232	5.0	12	.6	0.0	997
2 25 PCT T	380	.826	12.79	305	13.709	10392	32	1335	82	.077	2.5	103	6.3	18.1	317
3 55 PCT T	315	.109	13.35	1088	13.895	19606	38	239	918	.197	5.6	35	61.9	39.9	188
4 25 PCT T	165	.413	12.93	355	13.562	10115	19	929	99	.077	1.1	71	7.2	19.3	315
5 10 PCT T	130	.359	12.25	120	12.419	9396	10	973	28	.057	.5	27	1.6	7.0	376
6 25 PCT T	115	.561	12.93	390	13.509	10251	10	860	92	.077	.8	64	7.1	18.8	317
7 90 PCT T	2200	2.850	13.07	1195	16.172	21500	336	7659	569	.113	37.9	865	63.7	66.9	79
8 25 PCT T	105	.957	13.07	360	13.539	10070	9	682	92	.077	.7	53	7.1	18.7	317
9 C.T.	99160	.201	.23	6	5.865	862	785	72	8	.193	112.3	10	.1	0.0	607

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.5	0.0	0	9.2	0	0	.069	0	600	15.7	3.2	1.9	.9	5.1	0.0
2 25 PCT T	12.6	23.8	62	22.1	.930	3.9	.063	.566	2000	15.9	.5	9.5	3.6	8.9	7.1
3 55 PCT T	7.9	52.5	137	31.9	.608	2.9	.061	.370	2010	16.9	2.0	3.5	36.0	29.6	30.0
4 25 PCT T	12.5	29.1	63	22.3	.929	4.2	.062	.562	2000	16.2	.2	7.0	9.7	9.0	7.2
5 10 PCT T	19.9	9.3	25	18.0	1.939	3.3	.057	1.177	1990	17.5	.1	3.1	1.0	5.9	2.1
6 25 PCT T	12.9	25.9	68	22.6	.876	4.0	.062	.533	2000	16.2	.1	6.5	9.4	9.1	7.7
7 90 PCT T	3.2	87.2	224	46.2	.530	7.7	.072	.922	2030	13.8	22.2	62.8	90.5	27.9	38.2
8 25 PCT T	12.9	25.8	68	22.5	.873	4.9	.061	.531	2000	16.9	.2	9.9	5.1	9.1	7.7
9 C.T.	23.9	0.0	0	1.9	0	0	.027	0	2000	37.5	71.6	.9	.0	1.9	0.0
1 IDLE	17.6	0.0	0	3.7	0	0	.062	0	600	16.1	3.0	1.0	.9	9.5	0.0
2 25 PCT T	12.5	24.2	64	22.8	.991	3.5	.062	.573	2000	14.1	1.5	8.3	9.1	9.1	7.1
3 55 PCT T	7.9	52.9	137	32.2	.608	8.1	.061	.370	2020	16.9	3.9	7.8	39.6	29.7	29.7
4 25 PCT T	12.9	25.9	68	22.3	.861	3.7	.061	.529	2010	16.3	.6	5.7	9.7	8.9	7.6
5 10 PCT T	19.8	9.9	25	18.9	1.962	3.1	.057	1.199	2000	17.5	.3	2.2	1.0	5.5	2.0
6 25 PCT T	12.5	25.3	66	22.6	.895	3.7	.061	.559	2020	16.9	.5	5.3	9.5	9.1	7.9
7 90 PCT T	3.1	89.7	230	47.9	.528	6.9	.079	.321	2050	13.5	22.8	69.6	91.1	27.9	38.7
8 25 PCT T	12.5	25.8	66	22.2	.882	3.8	.061	.590	2000	16.3	.9	9.3	9.6	8.9	7.8
9 C.T.	23.9	0.0	0	1.9	0	0	.029	0	2000	91.1	67.5	.8	.0	1.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 8.9 59 8.8

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 8.7 65 8.2

TWO CYCLE COMPOSITE -

HC- FID	0.35(8.9) + 0.65(8.7) =	8.639	G/KW HR	(6.442 BS)
CO- NDIR	0.35(58.4) + 0.65(65.3) =	62.938	G/KW HR	(96.933 BS)
NOx-CL	0.35(8.8) + 0.65(8.2) =	8.390	G/KW HR	(6.256 BS)
HC + NOX =		17.029	G/KW HR	(12.699 BS)
SFC =		.998	KG/KW HR	(.736 BS)

TABLE E-3. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-219 RUN-02 06-19-76 FUEL INJ PMP AT 250 STD TIM PL NO AIR K= 1.109 HUM= 18.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON G/HR	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	1920	.969	13.93	69	19.539	1919	20	113	3	.232	4.7	26	.7	0.0	997
2 25 PCT T	90	.088	13.87	350	13.168	10029	8	135	98	.077	.6	10	7.6	17.9	325
3 55 PCT T	125	.115	13.78	1069	13.909	13925	19	213	392	.197	2.1	36	57.6	38.1	201
4 25 PCT T	10	.061	13.35	425	13.912	10115	1	93	118	.077	.1	7	9.1	18.5	323
5 10 PCT T	5	.035	12.65	135	12.686	7893	0	99	31	.057	.0	3	1.8	6.9	389
6 25 PCT T	5	.051	13.35	400	13.901	10115	0	78	111	.077	.0	6	8.6	18.5	323
7 90 PCT T	2280	2.430	13.99	1358	14.382	21001	336	6811	691	.113	38.0	770	72.9	65.7	81
8 25 PCT T	30	.090	13.99	995	13.536	10020	3	61	122	.077	.2	5	9.9	18.5	323
9 C.T.	90640	.015	.15	5	3.235	435	610	5	0	.193	87.3	1	.0	0.0	605
1 IDLE	2990	.312	13.78	69	19.372	1428	33	74	3	.232	7.6	17	.6	0.0	950
2 25 PCT T	300	.077	13.21	385	13.321	10115	26	118	108	.077	2.0	9	8.3	18.5	325
3 55 PCT T	295	.109	13.64	1069	13.771	19107	28	215	901	.197	5.2	32	59.0	38.8	198
4 25 PCT T	120	.056	13.35	970	13.920	10160	10	86	131	.077	.8	7	10.1	19.1	323
5 10 PCT T	25	.030	12.65	190	12.689	7756	5	37	32	.057	.3	2	1.8	6.9	389
6 25 PCT T	45	.051	13.21	980	13.268	9929	5	77	122	.077	.4	6	9.4	18.4	323
7 90 PCT T	2200	2.470	13.49	1335	14.543	20911	320	4809	620	.113	36.1	769	70.1	65.2	81
8 25 PCT T	55	.090	13.35	950	13.397	9939	5	61	123	.077	.4	5	9.5	18.5	325
9 C.T.	37760	.010	.15	5	3.992	435	609	3	0	.193	87.1	0	.0	0.0	605

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- NV	CHP	CTQ	FC	HSEC	ASNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOx	FUEL	POWER
1 IDLE	17.6	0.0	0	9.0	0	0	.066	0	600	15.3	3.5	3.0	.9	5.0	0.0
2 25 PCT T	12.8	29.0	63	22.1	.922	9.2	.059	.561	2000	14.8	.9	1.2	9.5	9.1	7.2
3 55 PCT T	7.9	51.1	139	39.7	.401	7.8	.063	.366	2000	16.0	1.6	9.0	39.5	29.1	29.9
4 25 PCT T	12.7	29.8	65	22.3	.900	9.0	.060	.597	2000	16.5	.0	.8	5.9	9.2	7.5
5 10 PCT T	15.3	9.3	29	17.9	1.880	3.9	.057	1.199	1990	17.9	.0	.3	1.1	5.3	2.1
6 25 PCT T	12.7	29.8	65	22.3	.899	9.6	.060	.597	2000	16.6	.0	.7	5.1	9.2	7.5
7 90 PCT T	3.2	88.1	229	66.3	.525	7.9	.075	.320	2030	13.9	28.6	89.9	93.3	28.0	38.9
8 25 PCT T	12.7	29.8	65	22.2	.893	9.0	.061	.593	2000	16.9	.1	.5	5.6	9.1	7.5
9 C.T.	23.8	0.0	0	1.9	0	0	.021	0	1990	97.9	65.7	.1	.0	1.1	0.0
1 IDLE	17.7	0.0	0	3.7	0	0	.065	0	600	15.9	5.5	7.0	.9	9.6	0.0
2 25 PCT T	12.8	29.8	65	22.3	.898	9.9	.060	.596	2000	14.6	1.9	1.1	9.9	9.2	7.9
3 55 PCT T	7.8	52.0	136	11.1	.598	7.9	.062	.386	2000	16.1	3.0	3.7	39.9	29.5	29.7
4 25 PCT T	12.7	25.4	63	22.9	.826	5.2	.060	.532	2000	16.5	.6	.8	6.0	9.3	7.7
5 10 PCT T	15.3	9.2	29	17.1	1.859	3.5	.057	1.128	1980	17.9	.2	.3	1.1	5.2	2.0
6 25 PCT T	12.7	29.7	65	22.0	.890	5.0	.060	.591	1990	16.7	.3	.7	5.6	9.1	7.9
7 90 PCT T	3.2	87.9	228	66.1	.527	7.2	.074	.321	2010	13.2	26.0	90.8	91.5	28.0	38.9
8 25 PCT T	12.8	29.7	65	21.9	.885	5.1	.060	.538	1990	16.6	.3	.4	5.6	9.0	7.9
9 C.T.	23.8	0.0	0	1.9	0	0	.020	0	2000	51.1	62.8	.1	.0	1.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 7.1 96 8.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 7.9 95 9.0

TWO CYCLE COMPOSITE -

HC- FID 0.35(7.1) + 0.65(7.9) = 7.723 G/KW HR (5.923 GS)

CO- NDIR 0.35(95.9) + 0.65(95.0) = 95.319 G/KW HR (33.799 GS)

NOx-CL 0.35(8.9) + 0.65(9.0) = 8.998 G/KW HR (6.672 GS)

HC + NOx = 16.220 G/KW HR (12.095 GS)

SFC = .992 KG/KW HR (.727 GS)

TABLE E-4. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-214 RUN-03 04-19-76 FUEL INJ POT AT 350 STD TIM PL NO AIR K= 1.057 HUM= 13.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT..	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	2690	2.960	12.79	48	15.551	2091	90	652	3	.232	9.2	151	.7	0.0	952
2 25 PCT T	115	.115	13.93	535	14.057	9525	9	157	127	.077	.7	12	9.8	17.5	368
3 55 PCT T	700	.928	14.54	1549	15.098	19293	75	819	515	.197	11.1	120	75.7	39.2	239
4 25 PCT T	95	.093	14.39	620	14.488	9662	3	125	195	.077	.3	10	11.2	18.0	366
5 10 PCT T	5	.035	13.21	215	13.296	7530	0	91	93	.057	.0	2	2.9	6.9	919
6 25 PCT T	30	.077	14.39	585	14.470	9525	2	102	135	.077	.2	8	10.9	18.0	368
7 90 PCT T	2380	9.290	12.25	785	14.819	21843	357	1126R	358	.113	90.3	1273	90.5	64.9	99
8 25 PCT T	95	.088	14.39	630	14.483	9662	3	118	198	.077	.3	9	11.9	18.0	364
9 C.T.	20980	.389	5.71	13	8.262	1315	399	125	1	.193	99.3	18	.1	0.0	605
1 IDLE	1920	1.198	13.49	62	15.057	1860	27	299	9	.232	6.3	69	.6	0.0	960
2 25 PCT T	185	.109	14.23	530	14.355	9525	19	139	123	.077	1.1	11	9.5	17.9	368
3 55 PCT T	730	.992	14.39	1549	14.915	19288	80	855	521	.197	11.7	126	76.6	39.1	239
4 25 PCT T	90	.082	14.23	605	14.322	9525	7	111	191	.077	.5	9	10.9	18.0	368
5 10 PCT T	50	.059	13.35	205	13.396	7525	3	96	91	.057	.2	3	2.3	7.0	919
6 25 PCT T	55	.077	14.23	560	14.314	9525	5	109	131	.077	.9	8	10.1	18.0	366
7 90 PCT T	2500	9.810	11.99	660	17.089	22224	376	12637	292	.113	92.5	1428	33.0	66.6	91
8 25 PCT T	45	.077	14.39	630	14.479	9680	5	102	195	.077	.9	8	11.2	18.0	368
9 C.T.	22900	.287	6.02	18	8.678	1315	359	88	1	.193	51.9	13	.1	0.0	605

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- NV	CHP	CTQ	FC	SFC BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.8	0.0	0	9.5	R	R	.071	R	600	19.0	8.2	9.9	.9	5.5	0.0
2 25 PCT T	19.5	23.5	41	21.0	.895	5.5	.063	.599	2010	15.8	.6	.8	6.0	8.5	7.1
3 55 PCT T	9.9	52.6	137	31.9	.597	10.0	.068	.363	2020	19.8	10.0	7.5	96.7	29.3	30.9
4 25 PCT T	19.9	29.1	43	21.3	.883	6.1	.065	.537	2000	15.9	.2	.6	6.9	8.6	7.3
5 10 PCT T	16.5	9.3	25	14.6	1.786	9.7	.060	1.085	1990	16.7	.0	.1	1.5	5.0	2.1
6 25 PCT T	19.5	29.2	63	21.0	.869	5.7	.065	.528	2000	15.9	.2	.5	6.9	8.5	7.3
7 90 PCT T	3.7	87.0	225	98.2	.559	9.2	.078	.337	2030	12.8	34.2	79.9	25.0	28.7	38.6
8 25 PCT T	19.9	29.2	63	21.3	.881	6.2	.065	.536	2000	15.9	.2	.6	7.0	8.6	7.3
9 C.T.	23.8	0.0	0	2.9	R	R	.039	R	2010	25.9	99.3	1.1	.1	2.2	0.0
1 IDLE	18.1	0.0	0	9.1	R	R	.068	R	600	19.7	5.5	9.1	.9	5.0	0.0
2 25 PCT T	19.5	23.9	61	21.0	.898	5.9	.069	.596	2000	15.5	.9	.6	6.2	8.5	7.1
3 55 PCT T	9.9	52.9	137	31.5	.601	10.2	.067	.364	2010	19.9	10.2	7.5	99.7	29.9	30.3
4 25 PCT T	19.5	29.2	63	21.0	.869	6.0	.069	.528	2000	15.6	.5	.5	7.1	8.5	7.3
5 10 PCT T	16.5	9.9	25	14.7	1.785	9.5	.060	1.085	2000	16.6	.2	.2	1.5	5.0	2.1
6 25 PCT T	19.9	29.2	63	21.0	.869	5.5	.069	.528	2000	15.4	.3	.5	6.5	8.5	7.3
7 90 PCT T	3.6	86.6	225	99.0	.566	9.5	.080	.399	2020	12.6	37.1	85.3	21.9	29.2	38.5
8 25 PCT T	19.5	29.2	64	20.9	.869	6.1	.065	.525	2000	15.9	.3	.5	7.2	8.5	7.3
9 C.T.	23.8	0.0	0	2.9	R	R	.041	R	2000	29.2	95.0	.8	.0	2.2	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 6.0 86 8.7

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 6.2 90 8.3

TWO CYCLE COMPOSITE -

HC- FID	0.35(6.0) + 0.65(6.2) =	6.107	G/KW	HP	(4.554 BS)
CO- NDIR	0.35(86.3) + 0.65(90.9) =	88.930	G/KW	HP	(66.315 BS)
NOx-CL	0.35(8.7) + 0.65(8.3) =	8.367	G/KW	HP	(6.319 BS)
	HC + NOX =	14.574	G/KW	HP	(10.868 BS)
	SFC =	.953	KG/KW	HP	(.795 BS)

TABLE E-5. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-219 RUN-09 06-19-76 FUEL INJ POT AT 150 STD TIM PL 40 AIR K= 1.053 HUM= 13.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	2320	.153	11.12	35	11.529	1996	99	59	2	.232	10.3	12	.5	0.0	901
2 25 PCT T	200	.115	11.12	90	11.259	11299	22	231	31	.077	1.7	18	2.9	17.9	239
3 55 PCT T	90	.109	12.12	590	12.239	15331	13	263	237	.197	1.8	39	39.8	38.9	119
4 25 PCT T	60	.082	11.34	115	11.999	11209	6	143	39	.077	.5	13	3.0	18.5	229
5 10 PCT T	290	.082	11.00	50	11.119	9117	26	134	19	.057	1.5	8	.8	4.9	310
6 25 PCT T	45	.072	11.29	95	11.319	11299	7	195	33	.077	.6	11	2.6	18.1	239
7 90 PCT T	790	.955	14.59	2256	15.085	20003	119	1220	1096	.113	13.5	138	118.2	65.9	63
8 25 PCT T	35	.054	11.34	115	11.920	11022	9	109	39	.077	.3	8	3.0	18.1	239
9 C.T.	35200	.015	.19	6	3.690	907	967	7	1	.193	123.9	1	.1	0.0	599
1 IDLE	9650	.181	11.00	28	11.693	1819	99	57	2	.232	10.9	13	.9	0.0	901
2 25 PCT T	340	.115	11.12	85	11.279	11299	90	232	30	.077	3.1	18	2.3	18.0	231
3 55 PCT T	190	.098	12.25	580	12.369	15291	26	295	250	.197	3.8	34	36.7	39.0	119
4 25 PCT T	150	.077	11.34	105	11.959	11299	14	153	34	.077	1.3	12	2.8	18.0	231
5 10 PCT T	370	.077	10.88	95	10.998	9026	33	128	13	.057	1.9	7	.7	7.0	310
6 25 PCT T	120	.077	11.98	105	11.570	11385	17	153	36	.077	1.0	12	2.8	18.1	226
7 90 PCT T	770	.928	14.39	2256	14.986	19913	117	1154	1059	.113	13.2	131	119.1	65.3	63
8 25 PCT T	75	.054	11.98	115	11.599	11209	8	110	39	.077	.6	8	3.0	18.6	231
9 C.T.	33920	.015	.11	5	3.521	680	656	4	0	.193	98.8	1	.0	0.0	599

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- NV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 IDLE	15.5	0.0	0	9.9	0	0	.053	0	600	19.0	6.7	5.0	.3	5.1	0.0
2 25 PCT T	9.2	23.9	41	29.8	1.062	1.9	.051	.696	2000	19.5	1.1	7.2	1.5	9.5	7.0
3 55 PCT T	9.5	52.1	137	33.8	.649	9.6	.055	.395	2000	18.0	1.2	15.6	21.0	29.8	29.9
4 25 PCT T	9.0	29.9	44	29.7	.996	1.6	.052	.605	1990	19.2	.3	5.1	1.8	9.5	7.5
5 10 PCT T	12.2	9.3	25	20.1	2.157	1.4	.051	1.312	1990	19.8	1.0	3.1	.5	5.7	2.1
6 25 PCT T	9.2	29.2	44	29.9	1.028	1.9	.051	.625	2000	19.9	.9	9.5	1.5	9.6	7.3
7 90 PCT T	2.5	88.9	228	99.1	.499	12.1	.068	.309	2090	19.7	8.7	55.7	71.5	29.9	39.0
8 25 PCT T	9.2	29.2	44	29.3	1.002	1.6	.052	.610	2000	19.3	.2	9.9	1.8	9.9	7.3
9 C.T.	23.9	0.0	0	2.0	0	0	.018	0	2010	59.8	80.9	.9	.0	1.9	0.0
1 IDLE	15.8	0.0	0	9.0	0	0	.059	0	600	18.7	13.9	5.5	.2	9.7	0.0
2 25 PCT T	9.1	29.2	44	29.9	1.029	1.3	.051	.624	2000	19.5	2.2	7.5	1.9	9.7	7.3
3 55 PCT T	9.5	52.2	137	33.6	.643	9.9	.056	.391	2000	17.9	2.8	15.1	21.9	29.9	30.0
4 25 PCT T	9.1	29.2	43	29.8	1.026	1.5	.052	.629	2000	19.2	.9	9.9	1.7	9.6	7.3
5 10 PCT T	12.2	9.3	25	19.9	2.137	1.4	.050	1.298	1990	20.0	1.9	3.1	.9	5.7	2.1
6 25 PCT T	8.9	29.2	44	25.1	1.036	1.5	.053	.630	2000	19.0	.7	5.0	1.7	9.7	7.3
7 90 PCT T	2.5	87.6	228	93.9	.501	12.3	.067	.305	2020	19.9	9.6	59.9	71.0	25.0	38.6
8 25 PCT T	9.1	25.0	44	29.7	.988	1.6	.052	.601	2000	19.1	.5	9.6	1.8	9.6	7.5
9 C.T.	23.4	0.0	0	1.5	0	0	.017	0	2010	57.5	68.9	.9	.0	1.1	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 8.3 13 8.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 7.9 13 9.0

TWO CYCLE COMPOSITE -

HC- FID 0.35(8.3) + 0.65(7.9) = 7.673 G/KW HR (5.721 BS)

CO- NDIR 0.35(13.3) + 0.65(12.8) = 12.932 G/KW HR (9.643 BS)

NOx-CL 0.35(8.9) + 0.65(9.0) = 8.959 G/KW HR (6.677 BS)

HC + NOX = 16.627 G/KW HR (12.398 BS)

SFC = .472 KG/KW HR (.777 BS)

TABLE E-6. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-2 TEST-215 RUN-11 06-17-76 FUEL INJ AIR-FUEL CYL TO CYL CHECK AT IDLE K= .990 HUM= 10.3 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	600	2520	.743	14.39	35	15.990	1819	34	181	3	33.8	181	2.9	0.0	0
2	600	1080	.300	14.59	67	14.963	1819	15	73	3	14.9	73	2.7	0.0	0
3	600	1080	.935	14.39	39	14.993	1819	15	107	3	14.9	107	3.0	0.0	0
4	600	1290	.598	14.39	36	15.129	1819	17	145	3	16.9	145	3.0	0.0	0
5	600	920	.999	14.39	29	14.993	1819	13	110	3	12.7	110	3.0	0.0	0
6	600	1790	.288	14.39	27	15.392	1819	19	188	3	19.9	188	3.0	0.0	0
7	600	700	.325	14.59	71	14.994	1819	10	80	3	9.7	80	2.8	0.0	0
8	600	1920	.659	14.59	80	15.919	1819	24	157	3	25.8	157	3.1	0.0	0

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CID	FC	BSHC	BSCO	BSNOx	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1		0.0	0.0	0	0.0	0	0	0	0	14.9	.070	0	0	0	0
2		0.0	0.0	0	0.0	0	0	0	0	14.9	.067	0	0	0	0
3		0.0	0.0	0	0.0	0	0	0	0	14.9	.067	0	0	0	0
4		0.0	0.0	0	0.0	0	0	0	0	14.7	.068	0	0	0	0
5		0.0	0.0	0	0.0	0	0	0	0	14.9	.067	0	0	0	0
6		0.0	0.0	0	0.0	0	0	0	0	14.5	.069	0	0	0	0
7		0.0	0.0	0	0.0	0	0	0	0	14.9	.067	0	0	0	0
8		0.0	0.0	0	0.0	0	0	0	0	14.9	.069	0	0	0	0

ID =

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-2 TEST-215 RUN-12 06-17-76 FUEL INJ AIR-FUEL CYL TO CYL CHECK 10 PCT K= .990 HUM= 10.3 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	340	.222	11.73	88	12.036	4165	57	309	20	57.3	309	19.6	6.8	0
2	2000	290	.136	12.93	153	13.093	4165	17	172	32	16.8	172	31.9	6.8	0
3	2000	70	.072	12.38	125	12.960	4165	6	95	27	5.1	95	26.9	6.8	0
4	2000	30	.096	12.79	176	12.839	4165	2	59	37	2.1	59	36.8	6.8	0
5	2000	40	.051	12.25	130	12.305	4165	3	68	29	3.0	68	28.3	6.8	0
6	2000	40	.061	12.38	158	12.446	4165	3	81	34	2.9	81	34.1	6.8	0
7	2000	220	.125	12.25	115	12.900	4165	16	147	24	14.1	147	25.5	6.8	0
8	2000	270	.159	12.38	135	12.569	4165	20	208	29	19.6	208	28.8	6.8	0

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CID	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1		0.0	9.2	29	18.0	6.26	33.22	2.17	1.961	18.3	.055	8.90	44.56	2.91	1.193
2		0.0	9.2	29	18.0	1.89	18.80	3.97	1.961	14.9	.059	2.96	25.21	9.65	1.193
3		0.0	9.2	29	18.0	.56	10.90	2.98	1.961	17.7	.056	.75	13.95	3.99	1.193
4		0.0	9.2	29	18.0	.23	6.42	4.07	1.961	17.2	.058	.31	8.61	5.45	1.193
5		0.0	9.2	29	18.0	.72	7.46	3.13	1.961	18.0	.056	.93	10.01	4.20	1.193
6		0.0	9.2	29	18.0	.32	8.89	3.77	1.961	17.8	.056	.43	11.92	5.05	1.193
7		0.0	9.2	29	18.0	1.77	18.25	2.82	1.961	17.8	.056	2.37	24.47	3.78	1.193
8		0.0	9.2	29	18.0	2.19	22.77	3.19	1.961	17.4	.057	2.87	30.54	4.27	1.193

ID =

TABLE E-7. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-215 RUN-13 06-17-76 FUEL INJ AIR-FUEL CYL TO CYL CHECK 25 PCT K= .990 HUM= 10.3 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	2250	.222	12.25	255	12.729	9929	198	351	66	197.7	351	65.7	17.7	0
2	2000	1080	.209	14.08	590	14.906	9929	86	286	129	84.7	286	122.9	17.7	0
3	2000	290	.109	13.35	330	13.986	9929	20	163	91	20.0	163	90.0	17.7	0
4	2000	120	.093	13.78	590	13.887	9929	10	135	129	9.7	135	127.5	17.7	0
5	2000	80	.077	13.35	410	13.936	9929	7	116	101	6.7	116	100.1	17.7	0
6	2000	220	.109	12.93	455	13.069	9929	19	168	115	18.9	168	119.2	17.7	0
7	2000	790	.153	13.35	900	13.586	9929	61	227	98	61.1	227	96.5	17.7	0
8	2000	1300	.193	13.07	365	13.909	9929	109	290	90	108.6	290	84.3	17.7	0

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOx	SFC KG/KW HR
1		0.0	23.7	62	22.0	8.37	19.87	2.81	.928	17.3	.058	11.23	19.99	3.77	.569
2		0.0	23.7	62	22.0	3.59	12.10	5.26	.928	15.9	.065	4.81	16.22	7.05	.569
3		0.0	23.7	62	22.0	.85	6.91	3.85	.928	16.9	.061	1.13	9.26	5.16	.569
4		0.0	23.7	62	22.0	.41	5.72	5.46	.928	16.0	.062	.55	7.67	7.32	.569
5		0.0	23.7	62	22.0	.28	4.89	4.28	.928	16.5	.061	.38	6.56	5.74	.569
6		0.0	23.7	62	22.0	.80	7.13	4.89	.928	17.0	.059	1.07	9.56	6.55	.569
7		0.0	23.7	62	22.0	2.59	9.61	4.13	.928	16.3	.061	3.47	12.89	5.54	.569
8		0.0	23.7	62	22.0	4.68	12.26	3.82	.928	16.5	.061	6.17	16.45	5.12	.569

ID =

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-215 RUN-14 06-17-76 FUEL INJ AIR-FUEL CYL TO CYL CHECK 55 PCT K= .990 HUM= 10.3 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	5760	.227	12.79	960	13.663	19515	686	988	391	685.6	988	337.9	38.2	0
2	2000	3680	.364	14.23	1937	14.994	19515	339	729	963	339.9	729	958.5	38.2	0
3	2000	760	.181	13.93	1915	14.197	19515	88	379	980	87.8	379	975.9	38.2	0
4	2000	860	.293	14.23	1685	14.623	19515	99	588	529	99.1	588	523.5	38.2	0
5	2000	900	.159	14.08	1903	14.286	19515	96	326	973	96.0	326	968.5	38.2	0
6	2000	1170	.295	13.93	1668	14.302	19515	129	503	555	128.6	503	549.6	38.2	0
7	2000	2360	.295	14.08	1738	14.592	19515	266	993	986	265.9	993	982.0	38.2	0
8	2000	3890	.187	13.07	1312	13.688	19515	957	988	962	957.1	988	957.2	38.2	0

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOx	SFC KG/KW HR
1		0.0	51.3	135	32.0	13.99	9.56	6.69	.629	16.1	.062	18.02	12.82	9.97	.380
2		0.0	51.3	135	32.0	6.65	14.19	9.09	.629	14.8	.067	8.92	19.03	12.17	.380
3		0.0	51.3	135	32.0	1.72	7.33	9.91	.629	15.7	.063	2.31	9.83	12.62	.380
4		0.0	51.3	135	32.0	1.99	11.53	10.37	.629	15.2	.066	2.60	15.47	13.90	.380
5		0.0	51.3	135	32.0	.90	6.38	9.28	.629	15.6	.064	1.21	8.56	12.44	.380
6		0.0	51.3	135	32.0	2.52	9.85	10.88	.629	15.5	.064	3.38	13.21	14.59	.380
7		0.0	51.3	135	32.0	5.21	9.65	9.96	.629	15.2	.066	6.99	12.95	10.67	.380
8		0.0	51.3	135	32.0	8.96	9.85	9.05	.629	14.1	.062	12.01	10.52	12.19	.380

ID =

TABLE E-8. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-215 RUN-1 06-21-76 FUEL INJ - IDLE MODE 150-350 POT SETTING K= 1.061 HUM= 19.0 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	530	1700	.192	12.38	49	12.712	1819	27	91	2	27.1	91	2.2	0.0	917
2	590	1900	.192	12.45	53	12.998	1749	21	39	2	21.9	39	2.6	0.0	927
3	540	1360	.159	12.93	60	13.291	1860	21	95	3	21.9	95	3.0	0.0	939
4	580	1990	.239	12.93	66	13.331	1950	29	71	3	23.6	71	3.9	0.0	992
5	590	1300	.955	13.07	67	13.672	2091	22	137	3	21.8	137	3.5	0.0	997
6	600	1790	.869	13.07	66	14.131	2087	29	258	3	29.0	258	3.4	0.0	952
7	610	2120	1.262	12.79	65	14.291	2177	34	388	3	34.5	388	3.5	0.0	957
8	620	2960	1.790	12.52	63	14.589	2177	42	590	3	41.4	590	3.3	0.0	962
9	630	2820	2.380	12.25	62	14.950	2177	47	700	3	46.6	700	3.2	0.0	965

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1		16.9	0.0	0	9.0	R	R	R	R	17.3	.058	R	R	R	R
2		16.8	0.0	0	3.9	R	R	R	R	17.1	.059	R	R	R	R
3		17.1	0.0	0	9.1	R	R	R	R	16.7	.060	R	R	R	R
4		17.9	0.0	0	9.3	R	R	R	R	16.6	.060	R	R	R	R
5		17.6	0.0	0	9.5	R	R	R	R	16.7	.062	R	R	R	R
6		17.8	0.0	0	9.6	R	R	R	R	15.6	.064	R	R	R	R
7		18.0	0.0	0	9.8	R	R	R	R	15.9	.065	R	R	R	R
8		18.2	0.0	0	9.8	R	R	R	R	15.0	.067	R	R	R	R
9		18.3	0.0	0	9.8	R	R	R	R	14.6	.069	R	R	R	R

ID =

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-215 RUN-2 06-21-76 FUEL INJ - 10 PCT POWER 200-900 POT. SET. K= 1.061 HUM= 19.0 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2010	190	.035	12.25	130	12.301	9299	12	59	33	11.8	59	34.6	4.9	393
2	2030	35	.030	12.79	140	12.829	8900	3	92	36	2.7	92	38.7	7.0	366
3	2030	20	.020	12.79	138	12.812	8669	2	89	36	1.5	89	38.4	7.0	381
4	2030	20	.025	13.21	200	13.232	8573	1	93	53	1.5	93	55.6	7.0	391
5	2020	10	.025	13.78	210	13.806	8165	1	30	51	.7	30	53.8	7.0	409
6	2030	15	.025	13.78	200	13.807	8079	1	30	39	1.0	30	51.2	7.0	419
7	2020	20	.030	14.23	270	14.263	7939	1	39	50	1.3	39	53.0	7.0	419
8	2020	20	.030	14.39	270	14.423	7893	1	33	49	1.2	33	52.1	7.0	429
9	2020	20	.030	14.08	250	14.113	7802	1	39	46	1.2	39	48.7	7.0	432

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1		13.5	9.3	29	20.5	1.28	5.89	3.55	2.212	18.0	.056	1.72	7.89	4.76	1.395
2		14.9	9.9	29	19.9	.29	4.53	3.93	2.067	17.3	.058	.39	6.07	5.27	1.257
3		15.0	9.9	29	19.1	.16	2.94	4.31	2.033	17.3	.058	.22	3.97	5.78	1.237
4		15.9	9.9	29	18.9	.16	3.55	4.69	2.010	16.8	.060	.21	4.77	6.22	1.222
5		15.9	9.9	29	18.0	.07	3.26	4.97	1.922	16.1	.062	.10	4.37	5.99	1.169
6		16.3	9.9	29	17.8	.11	3.21	4.19	1.891	16.1	.062	.19	4.30	5.41	1.150
7		16.5	9.9	29	17.5	.19	3.69	5.40	1.867	15.4	.064	.18	4.96	7.25	1.135
8		16.7	9.9	29	17.9	.13	3.63	5.31	1.956	15.5	.065	.18	4.87	7.13	1.189
9		17.0	9.9	29	17.2	.19	3.67	4.97	1.835	15.8	.063	.18	4.92	6.67	1.114

ID =

TABLE E-9. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-215 RUN-3 04-21-76 FUEL INJ - 25 PCT POWER 200-900 POT. SET. K= 1.072 HUM= 19.7 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2010	30	.061	12.38	210	12.495	11113	3	111	62	3.0	111	66.8	17.9	277
2	2010	5	.035	12.79	280	12.824	10523	0	59	74	.5	59	81.8	18.0	312
3	2010	5	.035	13.35	390	13.386	10297	0	55	100	.9	55	106.8	18.0	328
4	2010	5	.030	13.78	490	13.811	9929	0	49	104	.4	49	113.2	18.0	343
5	2010	5	.035	14.08	520	14.114	9939	0	50	121	.4	50	130.3	18.0	351
6	2010	10	.096	14.39	570	14.437	9939	1	69	130	.8	69	139.6	18.0	361
7	2090	25	.067	14.59	600	14.609	9929	2	92	134	1.9	92	145.9	18.3	366
8	2090	60	.109	14.70	600	14.816	10115	5	150	136	4.2	150	145.8	18.4	363
9	2090	100	.233	14.86	650	15.105	10029	8	313	143	7.6	313	153.6	18.3	371

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	C10	FC	RSHC	RSCO	RSNOx	RSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOx	SFC KG/KW HR
1		10.9	29.0	63	29.5	.13	9.66	2.62	1.019	17.8	.056	.17	6.25	3.52	.620
2		12.3	29.1	63	23.2	.02	2.47	3.21	.962	17.3	.058	.03	3.32	4.31	.585
3		12.9	29.1	63	22.7	.02	2.32	4.20	.940	16.6	.060	.02	3.11	5.63	.572
4		13.5	29.2	63	22.0	.02	1.86	4.45	.910	16.1	.062	.02	2.50	5.97	.554
5		13.8	29.2	63	21.9	.02	2.12	5.12	.905	15.8	.063	.02	2.84	6.87	.551
6		14.2	29.2	63	21.9	.03	2.68	5.49	.905	15.9	.065	.04	3.59	7.36	.551
7		14.4	29.6	63	22.0	.08	3.81	5.65	.895	15.3	.065	.11	5.11	7.58	.545
8		14.3	25.9	65	20.3	.19	4.05	5.47	.829	15.1	.066	.25	8.12	7.39	.539
9		14.6	29.6	63	22.1	.31	12.99	5.45	.899	14.8	.068	.42	17.42	7.48	.547

ID =

TABLE E-10. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-215 RUN-9 06-21-76 FUEL INJ - 55 PCT POWER 150-350 POT. SET. K= 1.022 HUM= 19.7 G/KG.

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2050	30	.035	12.25	990	12.289	15699	5	91	187	9.3	91	200.1	39.9	119
2	2050	35	.035	12.25	515	12.289	15377	5	89	219	9.9	89	229.9	39.9	130
3	2050	90	.050	12.29	730	12.935	15105	5	96	285	5.3	96	305.9	90.0	155
4	2050	50	.051	13.35	980	13.907	19832	6	119	360	6.2	119	386.0	39.7	175
5	2050	60	.061	13.93	1129	13.998	19792	7	130	393	7.1	130	421.5	39.9	193
6	2050	80	.082	19.08	1323	19.171	19929	9	169	497	9.2	169	529.5	90.0	211
7	2050	190	.197	19.39	1937	19.553	19970	14	296	979	15.8	296	508.7	90.0	218
8	2050	220	.239	19.54	1915	19.809	19293	29	965	952	29.1	965	989.7	90.0	236
9	2050	550	.479	19.39	1926	19.127	19515	40	1307	959	60.1	1307	987.2	39.9	236

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1		4.5	53.5	137	34.6	.08	1.75	3.57	.647	18.0	.056	.11	2.34	4.78	.399
2		5.1	53.6	137	33.9	.09	1.71	4.09	.633	18.0	.056	.13	2.29	5.49	.395
3		6.1	53.6	137	33.3	.10	1.89	5.45	.621	17.3	.058	.14	2.97	7.31	.378
4		6.9	53.3	137	32.7	.12	2.19	6.92	.619	16.6	.060	.16	2.93	9.27	.373
5		7.4	53.6	137	32.5	.14	2.49	7.51	.607	15.9	.063	.18	3.34	10.08	.369
6		8.3	53.6	137	31.8	.18	3.24	8.55	.593	15.7	.064	.24	4.34	11.46	.361
7		8.6	53.6	137	31.9	.30	5.66	9.07	.595	15.3	.065	.40	7.60	12.14	.342
8		9.3	53.6	137	31.9	.96	8.89	8.69	.595	15.1	.066	.62	11.92	11.59	.356
9		9.3	53.6	137	32.0	1.15	25.00	8.69	.598	14.7	.068	1.54	33.52	11.65	.363

ID =

TABLE E-11. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-215 RUN-5 06-21-76 FUEL INJ - 90 PCT POWER 100-250 POT. SET. K= 1.107 HUM= 18.2 G/KG

		CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				VAC.
MODE	RPM	HC-FID	CO	CO2	NOX-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOX-CL	CKW	MM
1	2050	590	.350	14.39	2265	14.901	20593	95	983	1096	85.9	983	1158.8	65.9	30
2	2060	420	.992	14.23	2230	14.792	20003	96	1211	1005	95.5	1211	1111.9	66.5	98
3	2050	1020	.755	14.39	2159	15.261	20185	159	2016	998	153.8	2016	1099.9	66.1	61
4	2050	1590	1.328	14.08	1786	15.584	20689	239	3560	787	233.5	3560	871.1	66.2	66
5	2050	1920	2.020	13.78	1702	14.009	21097	279	5345	743	279.2	5345	822.3	66.3	71
6	2060	2100	3.120	14.54	1230	17.909	21727	296	7648	496	296.5	7648	548.5	66.5	79
7	2060	2220	3.500	12.79	1028	14.595	21909	338	9362	452	338.3	9362	500.2	66.6	79

		-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------							---CALC---		-------G/KW HR------			SFC
MODE	ID	HV	CHP	CTQ	FC	BSHC	BSCO	BSNOx	BSFC	A/F	F/A	HC	CO	NOx	KG/KW HR
1		1.2	88.9	224	95.9	.99	11.35	12.07	.519	15.0	.067	1.32	15.21	16.19	.312
2		1.9	89.2	227	99.1	1.10	13.91	11.59	.495	15.1	.066	1.47	18.65	15.47	.301
3		2.9	88.6	227	99.5	1.78	23.26	10.99	.502	14.5	.069	2.38	31.20	14.67	.305
4		2.6	88.8	227	95.4	2.70	91.08	9.08	.519	14.2	.071	3.61	55.09	12.18	.312
5		2.9	88.9	228	96.9	3.14	61.91	8.57	.522	13.7	.073	4.29	83.02	11.50	.318
6		2.9	89.2	227	97.9	3.99	87.83	5.69	.537	12.3	.082	4.57	117.79	7.63	.327
7		3.1	89.3	228	98.3	3.89	107.51	5.19	.591	13.1	.076	5.21	199.18	6.96	.329

ID =

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-215 RUN-6 06-21-76 FUEL INJ - CT MODE OFF-900 POT. SET. K= 1.107 HUM= 18.2 G/KG

		CONCENTRATION AS MEASURED				TOTAL	FUEL	CALCULATED G/HR			CORRECTED G/HR				VAC.
MODE	RPM	HC-FID	CO	CO2	NOX-CL	CARBON	CONS.	HC	CO	NO2	HC-FID	CO	NOX-CL	CKW	MM
1	2000	3990	.005	.09	1	.389	0	0	0	0	0.0	0	0.0	0.0	587
2	2000	3890	.005	.09	1	.929	95	91	1	0	90.6	1	.0	0.0	589
3	2010	25600	.005	.09	1	2.604	181	178	1	0	178.3	1	.0	0.0	589
4	2010	69000	.159	2.17	5	8.966	1588	1171	57	0	1170.6	57	.3	0.0	589
5	2010	69000	.120	1.69	4	8.370	1478	1305	49	0	1305.4	49	.3	0.0	582
6	1990	57600	.025	.15	4	6.995	1997	1953	13	0	1952.7	13	.4	0.0	582
7	2010	57600	.120	1.97	4	8.319	1439	1197	70	0	1196.9	70	.3	0.0	582
8	2010	59520	.187	2.96	4	9.272	1860	1229	76	0	1228.6	76	.3	0.0	587
9	2010	56480	.339	3.96	5	9.973	1950	1131	99	0	1131.2	99	.4	0.0	587

		-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------							---CALC---		-------G/KW HR------			SFC
MODE	ID	HV	CHP	CTQ	FC	BSHC	BSCO	BSNOx	BSFC	A/F	F/A	HC	CO	NOx	KG/KW HR
1		23.1	0.0	0	0.0	I	I	I	I	536.1	.002	I	I	I	I
2		23.0	0.0	0	.1	P	R	P	R	985.9	.002	P	R	R	P
3		23.0	0.0	0	.4	R	R	R	R	78.3	.013	R	R	R	R
4		23.0	0.0	0	1.5	P	R	R	R	22.3	.045	R	R	R	R
5		22.9	0.0	0	1.7	R	R	R	R	23.4	.042	R	R	R	R
6		22.9	0.0	0	3.3	R	P	R	P	33.2	.030	R	R	R	P
7		22.9	0.0	0	3.4	R	R	R	R	29.8	.033	R	R	R	R
8		23.1	0.0	0	4.1	R	R	R	R	21.5	.047	R	R	R	R
9		23.1	0.0	0	4.3	R	R	R	R	20.1	.050	R	R	R	R

ID =

TABLE E-12. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-215 RUN-X 06-21-76 FUEL INJ. - MODES SELECTED FOR BEST BSFC K= 1.086 HUM= 15.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1300	.955	13.07	67	13.672	2091	22	137	9	.232	5.1	32	.8	0.0	997
2 25 PCT T	5	.030	13.78	990	13.811	9979	0	99	115	.077	.0	3	8.8	18.0	393
3 55 PCT T	80	.082	14.08	1323	14.171	14929	9	169	986	.197	1.9	25	71.9	90.0	211
4 25 PCT T	5	.030	13.78	990	13.811	9979	0	99	115	.077	.0	3	8.8	18.0	393
5 10 PCT T	20	.030	14.23	270	14.263	7938	1	39	59	.057	.1	2	3.1	7.0	919
6 25 PCT T	5	.030	13.78	990	13.811	9979	0	99	115	.077	.0	3	8.8	18.0	393
7 90 PCT T	1020	.755	14.39	2159	15.261	20185	159	2016	1030	.113	17.9	228	116.9	66.1	61
8 25 PCT T	5	.030	13.78	990	13.811	9979	0	99	115	.077	.0	3	8.8	18.0	393
9 C.T.	3990	.000	.00	0	.399	0	0	0	0	.193	.0	0	.0	0.0	587

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1300	.955	13.07	67	13.672	2091	22	137	9	.232	5.1	32	.8	0.0	997
2 25 PCT T	5	.030	13.78	990	13.811	9979	0	99	115	.077	.0	3	8.8	18.0	393
3 55 PCT T	80	.082	14.08	1323	14.171	14929	9	169	986	.197	1.9	25	71.9	90.0	211
4 25 PCT T	5	.030	13.78	990	13.811	9979	0	99	115	.077	.0	3	8.8	18.0	393
5 10 PCT T	20	.030	14.23	270	14.263	7938	1	39	59	.057	.1	2	3.1	7.0	919
6 25 PCT T	5	.030	13.78	990	13.811	9979	0	99	115	.077	.0	3	8.8	18.0	393
7 90 PCT T	1020	.755	14.39	2159	15.261	20185	159	2016	1030	.113	17.9	228	116.9	66.1	61
8 25 PCT T	5	.030	13.78	990	13.811	9979	0	99	115	.077	.0	3	8.8	18.0	393
9 C.T.	3990	.000	.00	0	.399	0	0	0	0	.193	.0	0	.0	0.0	587

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	PERCENT OF TOTAL HC	CO	NOX	FUEL	POWER
1 I		17.6	0.0	0	9.5	R	R	.062	R	590	16.2	21.1	10.6	.9	5.6	0.0
2 25		13.5	29.2	63	22.0	.910	9.8	.062	.559	2010	16.1	.1	1.1	3.9	9.1	7.2
3 55		8.3	53.6	137	31.8	.593	9.3	.069	.361	2050	15.7	5.6	8.3	31.9	25.2	30.5
4 25		13.5	29.2	63	22.0	.910	9.8	.062	.559	2010	16.1	.1	1.1	3.9	9.1	7.2
5 10		16.5	9.9	24	17.5	1.867	5.9	.069	1.135	2020	15.6	.3	.6	1.9	5.9	2.1
6 25		13.5	29.2	63	22.0	.910	9.8	.062	.559	2010	16.1	.1	1.1	3.9	9.1	7.2
7 90		2.9	88.6	227	99.5	.502	11.9	.069	.305	2050	19.5	72.9	75.9	51.3	27.2	38.7
8 25		13.5	29.2	63	22.0	.910	9.8	.062	.559	2010	16.1	.1	1.1	3.9	9.1	7.2
9 CT		23.1	0.0	0	.0	R	R	.002	R	2000	606.2	.0	.0	.0	.0	0.0

MODE	ID	HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	PERCENT OF TOTAL HC	CO	NOX	FUEL	POWER
1 I		17.6	0.0	0	9.5	R	R	.062	R	590	16.2	21.1	10.6	.9	5.6	0.0
2 25		13.5	29.2	63	22.0	.910	9.8	.062	.559	2010	16.1	.1	1.1	3.9	9.1	7.2
3 55		8.3	53.6	137	31.8	.593	9.3	.069	.361	2050	15.7	5.6	8.3	31.9	25.2	30.5
4 25		13.5	29.2	63	22.0	.910	9.8	.062	.559	2010	16.1	.1	1.1	3.9	9.1	7.2
5 10		16.5	9.9	24	17.5	1.867	5.9	.069	1.135	2020	15.6	.3	.6	1.9	5.9	2.1
6 25		13.5	29.2	63	22.0	.910	9.8	.062	.559	2010	16.1	.1	1.1	3.9	9.1	7.2
7 90		2.9	88.6	227	99.5	.502	11.9	.069	.305	2050	19.5	72.9	75.9	51.3	27.2	38.7
8 25		13.5	29.2	63	22.0	.910	9.8	.062	.559	2010	16.1	.1	1.1	3.9	9.1	7.2
9 CT		23.1	0.0	0	.0	R	R	.002	R	2000	606.2	.0	.0	.0	.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------				1.3	16	12.0
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------				1.3	16	12.0
TWO CYCLE COMPOSITE -	HC- FID	0.35(1.3) + 0.65(1.3) =	1.271	G/KW HR	(.948 BS)
	CO- NDIR	0.35(15.9) + 0.65(15.9) =	15.897	G/KW HR	(11.854 BS)
	NOx-CL	0.35(12.0) + 0.65(12.0) =	12.027	G/KW HR	(8.968 BS)
		HC + NOX =	13.298	G/KW HR	(9.916 BS)
ID =		SFC =	.935	KG/KW HR	(.716 BS)

TABLE E-13. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-1 07-13-76 MODE 2 20-150 ECU DOT MAX EGR 19 BTDC K= 1.098 HUM= 17.0 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	690	.591	14.54	1937	15.209	20366	98	1598	639	97.7	1598	701.6	65.2	13
2	2000	1000	.909	14.38	1369	15.913	20568	152	2997	606	152.2	2997	665.2	65.2	15
3	2000	1320	1.306	14.08	1230	15.536	20912	198	3965	537	198.1	3965	578.9	65.2	20
4	2000	1620	1.990	13.78	1052	15.906	21228	248	5230	466	247.7	5230	511.7	65.2	20
5	2000	1790	2.500	13.59	883	16.190	21591	266	6735	391	266.9	6735	429.2	65.2	23
6	2000	1900	3.260	12.93	687	16.908	22135	295	8889	308	294.7	8889	337.8	65.2	23
7	2000	1960	3.700	12.65	588	16.576	22135	301	9981	261	301.3	9981	286.2	65.2	28
8	2000	2120	4.520	12.25	913	17.015	22639	326	12196	182	325.8	12196	200.2	65.2	28
9	2000	2290	5.120	11.84	363	17.239	23179	348	13906	162	348.5	13906	177.9	65.2	28

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	70	.5	87.9	230	44.9	1.19	18.65	7.96	.519	14.6	.068	1.53	25.02	10.00	.312
2	80	.6	87.9	230	45.3	1.79	28.55	7.07	.518	14.9	.069	2.38	38.29	9.48	.315
3	90	.8	87.9	230	45.0	2.31	40.99	6.24	.515	14.2	.070	3.10	54.23	8.40	.313
4	100	.8	87.9	230	46.8	2.99	61.09	5.99	.535	13.8	.072	3.88	81.86	7.30	.326
5	110	.9	87.9	230	47.6	3.11	78.60	5.56	.545	13.5	.074	4.17	105.91	6.12	.331
6	120	.9	87.9	230	48.8	3.99	103.68	3.59	.558	13.3	.075	4.61	139.09	4.82	.340
7	130	1.1	87.9	230	48.8	3.52	116.99	3.09	.558	13.1	.076	4.72	156.21	4.08	.340
8	140	1.1	87.9	230	49.9	3.80	141.76	2.13	.571	12.7	.079	5.10	190.10	2.85	.347
9	150	1.1	87.9	230	51.1	4.07	162.29	1.89	.585	12.9	.080	5.45	217.69	2.59	.356

ID = ECU

TABLE E-14. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-2 02-13-76 MODE 2 20-150 ECU DAT MAX EGR 16 BTDC K= 1.099 HUM= 14.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. HM
1	2000	600	.350	14.23	1569	14.625	20099	62	969	705	62.2	969	771.0	69.9	13
2	2000	700	.591	14.39	1983	15.060	20003	106	1585	659	105.9	1585	715.2	69.9	20
3	2000	1200	1.019	14.08	1926	15.236	20185	181	2727	627	181.2	2727	686.0	69.9	23
4	2000	1560	1.289	14.08	1288	15.592	20912	239	3905	562	239.0	3905	619.2	69.9	28
5	2000	1740	1.830	13.78	1112	15.809	20185	259	4720	471	259.2	4720	515.5	69.9	30
6	2000	1880	2.500	13.21	999	15.925	20684	280	6559	407	279.7	6559	445.2	69.9	36
7	2000	2020	3.210	12.79	736	16.232	21228	303	8980	320	303.3	8980	349.5	69.9	36
8	2000	2140	3.750	12.52	612	16.515	21596	321	9982	265	321.2	9982	289.9	69.9	36
9	2000	2280	9.570	11.99	938	16.823	21989	342	12022	189	342.9	12022	207.1	69.9	36

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- NV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	70	.5	87.1	229	99.2	.73	11.30	8.23	.507	15.2	.066	.97	15.16	11.03	.309
2	80	.8	87.1	229	99.1	1.29	18.50	7.63	.506	14.8	.068	1.66	29.80	10.29	.308
3	90	.9	87.1	229	99.5	2.11	31.83	7.32	.511	14.5	.069	2.89	42.68	9.82	.311
4	100	1.1	87.1	229	95.0	2.73	39.79	6.55	.517	14.2	.070	3.66	53.30	8.79	.314
5	110	1.2	87.1	229	99.5	2.97	55.08	5.50	.511	13.9	.072	3.98	73.87	7.38	.311
6	120	1.4	87.1	229	95.4	3.24	76.55	4.75	.529	13.7	.073	4.38	102.66	6.37	.318
7	130	1.4	87.1	229	96.8	3.54	98.97	3.73	.537	13.4	.075	4.75	132.72	5.00	.327
8	140	1.4	87.1	229	97.5	3.75	115.33	3.09	.545	13.1	.076	5.03	154.66	4.15	.332
9	150	1.4	87.1	229	98.3	4.00	140.31	2.21	.555	12.8	.078	5.36	188.14	2.96	.337

ID = ECU

TABLE E-15. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-3 07-13-76 MODE 7 90-150 ECU POT MAX EGR 18 BTDC K= 1.099 HUM= 16.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CK#	VAC. MM
1	2000	980	.561	19.23	1615	15.903	19323	199	1970	695	199.5	1970	760.9	69.9	30
2	2000	1360	.909	19.08	1516	15.193	19368	198	2397	699	198.1	2397	709.1	69.9	36
3	2000	1560	1.290	19.05	1392	15.099	19595	225	3168	589	225.2	3168	639.0	69.9	38
4	2000	1820	1.790	13.78	1207	15.228	19958	263	4579	507	263.4	4579	559.9	69.9	43
5	2000	1900	2.380	13.35	1028	15.998	20185	275	6085	432	275.5	6085	472.5	69.9	46
6	2000	2090	3.030	12.93	809	16.199	20638	298	7800	342	298.9	7800	374.9	69.9	46
7	2000	2160	3.450	12.52	662	16.918	20865	314	9370	279	315.6	9370	305.5	69.9	46

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- Nv	CHP	CTQ	FC	BSHC	BSCO	BSNOx	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	90	1.2	87.1	229	92.6	1.69	17.16	8.11	.989	14.9	.067	2.26	23.01	10.88	.298
2	100	1.9	87.1	229	92.7	2.31	27.39	7.51	.990	14.6	.068	3.10	36.74	10.08	.298
3	110	1.5	87.1	229	93.2	2.63	36.98	6.82	.996	14.3	.070	3.52	49.59	9.19	.302
4	120	1.7	87.1	229	93.0	3.07	53.38	5.92	.505	14.0	.072	4.12	71.58	7.93	.307
5	130	1.8	87.1	229	93.5	3.22	71.02	5.09	.511	13.7	.073	4.31	95.24	6.76	.311
6	140	1.8	87.1	229	95.5	3.48	91.09	4.00	.522	13.5	.074	4.67	122.08	5.34	.318
7	150	1.8	87.1	229	96.0	3.68	109.36	3.24	.528	13.2	.076	4.94	146.45	4.37	.321

ID = ECU

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-4 07-13-76 MODE 7 90-150 ECU POT MAX EGR 20 BTDC K= 1.099 HUM= 16.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CK#	VAC. MM
1	2000	1260	.997	19.80	1637	15.991	19323	180	1256	688	180.0	1256	793.9	69.9	30
2	2000	1320	.745	19.23	1572	15.135	19051	189	1918	657	189.2	1918	718.5	69.9	38
3	2000	1560	1.097	19.08	1415	15.359	19187	222	2769	597	222.3	2768	692.0	69.9	43
4	2000	1780	1.610	13.78	1265	15.593	19595	254	4082	528	255.5	4087	577.2	69.9	46
5	2000	1900	2.170	13.49	1088	15.878	20069	275	5535	454	274.7	5535	498.8	69.9	46
6	2000	2120	2.800	13.07	871	16.113	20321	307	7133	365	306.6	7133	398.9	69.9	46
7	2000	2140	3.500	12.65	687	16.398	20729	319	8937	288	313.8	8937	315.3	69.9	51

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- Nv	CHP	CTQ	FC	BSHC	BSCO	BSNOx	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	90	1.2	87.1	229	92.6	2.10	19.46	7.99	.989	14.9	.069	2.82	19.66	10.69	.298
2	100	1.5	87.1	229	92.8	2.21	22.39	7.67	.992	14.7	.068	2.96	30.03	10.28	.293
3	110	1.7	87.1	229	92.3	2.59	32.31	6.85	.986	14.9	.069	3.47	43.32	9.19	.295
4	120	1.8	87.1	229	93.2	2.98	47.78	6.14	.996	14.1	.071	4.00	63.96	8.26	.302
5	130	1.9	87.1	229	93.2	3.21	64.60	5.32	.507	13.8	.072	4.30	86.63	7.14	.309
6	140	1.8	87.1	229	94.8	3.59	83.25	4.24	.519	13.6	.074	4.80	111.69	5.71	.313
7	150	2.0	87.1	229	95.2	3.64	100.31	3.47	.525	13.2	.076	4.91	134.88	4.61	.319

ID = ECU

TABLE E-16. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-5 07-13-76 MODE 3 125-250 ECU POT NO EGR 19 BTDC K= 1.099 HUM= 16.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	120	.082	13.93	913	14.026	15876	15	188	155	15.3	188	169.7	39.8	91
2	2000	100	.054	12.25	513	12.317	15286	19	191	211	13.8	191	231.2	39.8	112
3	2000	80	.051	12.52	625	12.580	15059	11	123	298	10.7	123	271.7	39.8	127
4	2000	80	.046	12.93	798	12.985	14832	10	105	303	10.2	105	331.0	39.8	150
5	2000	80	.051	13.99	980	13.550	14651	10	111	352	9.7	111	389.8	39.8	173
6	2000	80	.041	14.08	1171	14.150	14787	9	129	406	9.5	129	444.3	39.8	188

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CID	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	125	3.6	53.9	190	35.0	.29	3.58	2.95	.455	15.9	.063	.39	4.80	3.96	.399
2	150	4.9	53.9	190	33.7	.24	2.48	4.02	.431	17.9	.056	.35	3.59	5.39	.389
3	175	5.0	53.9	190	33.2	.20	2.39	4.73	.421	17.6	.057	.27	3.19	6.39	.378
4	200	5.9	53.9	190	32.7	.19	2.01	5.76	.412	17.1	.059	.26	2.69	7.72	.372
5	225	6.8	53.9	190	32.3	.19	2.12	6.69	.405	16.4	.061	.25	2.84	8.98	.368
6	250	7.9	53.9	190	32.4	.18	2.94	7.73	.410	15.7	.064	.24	3.30	10.37	.371

ID = ECU

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-6 07-13-76 MODE 3 140-290 ECU POT 1.25 EGR 19 BTDC K= 1.099 HUM= 16.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	90	.090	14.08	575	14.125	15699	5	91	211	5.0	91	231.3	39.8	119
2	2000	90	.051	14.56	575	14.595	15558	5	110	283	4.8	110	322.4	39.8	127
3	2000	60	.125	14.70	590	14.832	15468	7	269	289	7.1	269	323.9	39.8	137
4	2000	289	.968	14.86	590	15.360	15422	32	999	180	32.1	999	196.9	39.8	150
5	2000	900	1.137	14.39	535	15.430	15699	103	2305	178	103.9	2305	195.1	39.8	160

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CID	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	140	4.7	53.9	190	39.5	.10	1.22	4.02	.496	15.8	.063	.13	2.31	5.40	.393
2	180	5.0	53.9	190	39.3	.09	2.09	3.87	.492	15.3	.065	.12	2.80	5.19	.391
3	200	5.9	53.9	190	39.1	.19	5.03	3.89	.488	15.0	.066	.18	6.79	5.21	.388
4	220	5.9	53.9	190	39.0	.61	18.07	3.93	.486	14.5	.069	.82	24.23	5.59	.387
5	290	6.3	53.9	190	39.6	1.97	93.87	3.39	.498	14.2	.071	2.69	58.83	4.55	.396

ID = ECU

TABLE E-17. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HO ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-2 07-13-76 MODE 3 160-260 ECU POT 1.25 EGR 18 BTDC K= 1.099 HUM= 16.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CRN	VAC. MM
1	2000	80	.062	13.78	615	13.856	19929	9	190	213	9.9	190	232.5	39.8	192
2	2000	85	.099	14.08	680	14.188	19379	10	282	229	9.7	282	250.2	39.8	160
3	2000	220	.227	14.59	720	14.792	19970	24	999	239	24.5	999	255.7	39.8	173
4	2000	700	.598	14.86	690	15.538	19970	75	1125	213	79.5	1125	233.3	39.8	183
5	2000	1290	1.178	14.08	610	15.399	19606	139	2256	192	139.2	2256	210.1	39.8	190
6	2000	1500	1.720	13.93	590	15.922	19787	160	3297	168	160.5	3297	183.3	39.8	190

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CMP	CTQ	FC	BSHC	BSCO	BSNOx	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOx	SFC KG/KW HR
1	160	5.6	53.9	190	31.8	.18	2.66	9.09	.595	16.0	.062	.29	3.57	5.92	.362
2	180	6.3	53.9	190	31.7	.19	3.89	9.35	.593	15.7	.064	.25	5.15	5.89	.361
3	200	6.8	53.9	190	31.9	.47	8.55	9.45	.597	15.1	.066	.62	11.17	5.97	.363
4	220	7.2	53.9	190	31.9	1.92	21.41	9.06	.597	14.3	.070	1.90	28.71	5.99	.363
5	250	7.5	53.9	190	32.2	2.55	92.93	3.44	.603	14.9	.070	3.92	57.57	9.90	.367
6	260	7.5	53.9	190	32.4	3.05	61.29	3.19	.610	13.9	.072	4.10	82.86	9.28	.371

ID = ECU

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HO ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-A 07-13-76 MODE 3 160-260 ECU POT MAX EGR 18 BTDC K= 1.099 HUM= 16.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CRN	VAC. MM
1	2000	140	.125	14.08	630	14.229	19970	18	258	176	18.4	258	192.1	39.8	192
2	2000	330	.275	14.54	595	14.853	19970	37	542	176	36.6	542	192.8	39.8	150
3	2000	880	.706	14.39	580	15.196	19929	95	1359	158	95.2	1359	172.3	39.8	168
4	2000	1380	1.389	13.93	650	15.672	19696	150	2656	192	149.7	2656	155.2	39.8	173
5	2000	1620	2.170	13.64	330	15.996	19832	172	4065	119	172.2	4065	124.6	39.8	180
6	2000	1740	2.990	13.07	295	16.312	19931	191	5414	93	191.1	5414	101.3	39.8	180

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CMP	CTQ	FC	BSHC	BSCO	BSNOx	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOx	SFC KG/KW HR
1	160	5.6	53.9	190	31.9	.35	4.90	3.39	.593	15.4	.064	.97	6.58	9.48	.363
2	180	5.9	53.9	190	31.9	.70	10.31	3.35	.593	15.0	.067	.93	13.82	9.50	.363
3	200	6.4	53.9	190	31.8	1.81	25.76	3.00	.595	14.6	.068	2.93	39.55	9.02	.362
4	220	6.8	53.9	190	32.9	2.85	50.59	2.30	.603	14.9	.070	3.82	67.78	3.62	.369
5	250	7.1	53.9	190	32.7	2.28	77.35	2.17	.612	13.7	.073	4.39	103.72	2.91	.372
6	260	7.1	53.9	190	33.8	4.49	106.87	1.74	.633	13.5	.074	9.88	193.32	2.36	.385

ID = ECU

TABLE E-18. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-9 07-13-76 MODE 3 160-260 ECU POT MAX EGR 22 BTDC K= 1.082 HUM= 15.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	360	.153	13.93	930	14.129	19515	92	318	197	91.8	318	158.8	39.9	137
2	2000	910	.295	14.08	530	14.372	19763	96	991	179	96.0	991	188.7	39.9	157
3	2000	920	.613	14.23	510	14.498	19197	99	1176	161	99.9	1176	179.0	39.9	148
4	2000	1990	1.242	13.78	995	15.206	19197	153	2380	138	153.2	2380	199.3	39.9	180
5	2000	1690	2.020	13.69	795	15.953	19696	179	3783	122	179.9	3783	131.6	39.9	183
6	2000	1860	2.990	11.98	300	14.631	19832	219	6021	101	213.7	6021	109.3	39.9	188

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	160	5.9	53.5	191	32.0	.80	6.09	2.29	.598	15.7	.064	1.07	8.11	3.79	.369
2	180	6.2	53.5	191	31.4	.88	9.39	3.32	.587	15.5	.065	1.17	12.52	4.45	.357
3	200	6.6	53.5	191	31.3	1.89	22.38	3.06	.585	14.9	.067	2.59	30.02	4.10	.356
4	220	7.1	53.5	191	31.3	2.91	45.29	2.42	.585	14.5	.069	3.91	60.73	3.52	.356
5	240	7.2	53.5	191	32.9	3.91	71.98	2.31	.605	13.9	.072	4.58	96.53	3.10	.368
6	260	7.9	53.5	191	32.7	4.07	119.57	1.92	.611	13.8	.068	5.45	153.69	2.58	.372

ID = ECU

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-10 07-13-76 MODE 2 160-260 ECU POT 1.0 EGR 19 BTDC K= 1.082 HUM= 15.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	5	.020	13.69	155	13.661	11299	0	33	92	.5	33	95.9	18.0	299
2	2000	5	.020	14.23	125	14.251	10932	0	31	95	.5	31	98.2	18.0	267
3	2000	5	.030	14.20	105	14.231	10523	0	44	94	.5	44	97.5	18.0	240
4	2000	15	.131	15.34	205	15.473	10891	1	185	98	1.2	185	51.6	18.0	290
5	2000	170	.976	15.19	195	15.475	10387	13	637	93	12.9	637	94.9	18.0	302
6	2000	580	1.157	14.70	180	15.923	10705	95	1571	90	99.7	1571	93.5	18.0	305

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	160	9.4	29.1	63	29.9	.02	1.92	1.79	1.030	14.3	.041	.03	1.90	2.91	.624
2	180	10.5	29.1	63	29.1	.02	1.32	1.89	1.001	15.4	.064	.02	1.77	2.53	.609
3	200	11.9	29.1	63	23.2	.02	1.85	1.86	.963	15.2	.066	.02	2.48	2.49	.586
4	220	11.9	29.1	63	23.9	.05	7.85	2.02	.992	14.5	.069	.07	10.52	2.71	.609
5	240	11.9	29.1	63	22.9	.55	26.99	1.82	.951	14.2	.070	.73	36.19	2.44	.570
6	260	12.0	29.1	63	23.6	1.89	44.59	1.70	.980	13.9	.072	2.59	59.23	2.28	.594

ID = ECU

TABLE E-19. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HO ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-11 07-13-76 MODE 2 160-260 ECU POT 1.0 EGR 18 BTDC K= 1.002 HUM= 15.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	10	.698	13.93	175	13.972	10030	1	59	92	.8	59	95.3	17.9	282
2	2000	10	.698	14.23	190	14.272	9839	1	57	94	.8	57	97.5	17.9	297
3	2000	20	.877	14.30	210	14.378	9798	2	103	96	1.5	103	50.0	17.9	312
4	2000	80	.222	15.18	195	15.411	9707	4	282	91	5.9	282	99.1	17.9	320
5	2000	980	.479	15.02	205	15.249	9707	34	890	92	33.9	890	95.9	17.9	328
6	2000	980	1.328	14.86	180	14.388	9752	47	1605	36	47.9	1605	38.7	17.9	335

MODE	ID	--------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------- MV	CWP	CID	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	140	11.1	29.0	43	22.2	.03	2.50	1.22	.923	15.9	.063	.05	3.35	2.38	.542
2	180	11.7	29.0	43	21.9	.03	2.91	1.86	.911	15.6	.064	.04	3.23	2.99	.559
3	200	12.3	29.0	43	21.6	.06	4.37	1.96	.898	15.1	.066	.09	5.86	2.63	.596
4	220	12.6	29.0	43	21.9	.29	11.99	1.73	.898	15.5	.064	.33	16.01	2.32	.591
5	240	12.9	29.0	43	21.9	1.93	35.57	1.28	.898	14.1	.071	1.92	47.70	2.38	.591
6	260	13.2	29.0	43	21.5	2.84	47.96	1.51	.896	13.6	.073	3.83	91.19	2.03	.599

ID = ECU

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HO ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-12 07-13-76 MODE 2 160-280 ECU POT 1.0 EGR 22 BTDC K= 1.039 HUM= 15.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	95	.672	13.69	190	13.717	9616	4	102	99	3.6	102	97.7	18.0	297
2	2000	50	.672	14.23	210	14.307	9525	4	97	96	3.8	97	50.1	18.0	317
3	2000	70	.115	14.56	220	14.642	9389	5	198	97	5.1	198	50.5	18.0	328
4	2000	220	.287	14.86	230	15.172	9435	14	361	97	15.6	361	51.2	18.0	335
5	2000	690	.738	14.30	225	15.517	9389	48	902	95	47.7	902	48.8	18.0	343
6	2000	1190	1.219	14.39	190	15.790	9163	74	1939	37	75.9	1939	39.6	18.0	351
7	2000	1500	1.748	13.93	180	15.862	9399	101	2099	35	101.2	2099	38.0	18.0	351

MODE	ID	--------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE-------- MV	CWP	CID	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	140	11.7	29.1	44	21.2	.15	9.31	1.87	.788	14.2	.062	.20	5.78	2.51	.535
2	180	12.5	29.1	43	21.0	.16	9.89	1.97	.872	15.6	.064	.21	5.99	2.49	.530
3	200	12.9	29.1	43	20.7	.22	6.37	1.98	.859	15.2	.066	.29	8.91	2.66	.523
4	220	13.2	29.1	43	20.8	.46	15.29	2.01	.869	14.7	.068	.59	20.50	2.70	.525
5	240	13.5	29.1	43	20.3	2.03	38.22	1.91	.859	14.3	.070	2.71	51.25	2.57	.523
6	260	13.8	29.1	43	20.3	3.22	60.72	1.56	.839	14.1	.071	4.31	81.93	2.09	.510
7	280	13.8	29.1	43	20.4	4.29	88.31	1.99	.855	13.9	.072	5.75	118.96	2.00	.520

ID = ECU

TABLE E-20. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-13 07-13-76 MODE 2 200 ECU POT 1.0 EGR 19-3B BTDC K= 1.079 HUM= 15.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CRW	VAC. MM
1	2000	80	.056	14.39	190	14.955	11249	7	88	99	7.1	88	53.0	18.0	269
2	2000	70	.061	14.54	195	14.609	10115	6	86	95	5.5	86	98.9	18.0	295
3	2000	60	.061	14.39	190	14.459	9929	5	85	94	4.7	85	97.0	18.0	305
4	2000	70	.072	14.23	200	14.310	9662	6	98	95	5.4	98	98.9	18.0	317
5	2000	70	.088	14.19	210	14.284	9935	5	115	95	5.2	115	99.0	18.0	325
6	2000	90	.109	14.54	215	14.654	9163	6	131	95	6.9	131	98.1	18.0	333
7	2000	140	.192	14.54	240	14.700	8981	11	175	99	11.1	175	52.5	18.0	340
8	2000	250	.181	14.39	220	14.600	8800	17	221	59	17.1	221	58.3	18.0	343

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- NV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	19	10.9	29.1	63	29.8	.30	3.29	2.08	1.030	15.9	.065	.90	5.01	2.79	.624
2	16	11.6	29.1	63	22.3	.23	3.63	1.90	.926	15.3	.065	.31	9.87	2.55	.563
3	18	12.0	29.1	63	22.0	.20	3.62	1.84	.913	15.9	.065	.27	9.85	2.47	.556
4	20	12.5	29.1	63	21.3	.23	9.15	1.90	.884	15.6	.064	.30	5.54	2.55	.538
5	22	12.8	29.1	63	20.8	.22	5.88	1.92	.869	15.9	.065	.29	6.55	2.58	.525
6	24	13.1	29.1	63	20.2	.23	5.55	1.89	.839	15.2	.066	.36	7.49	2.59	.510
7	26	13.6	29.1	63	19.8	.47	7.92	2.06	.822	15.2	.066	.63	9.95	2.77	.500
8	28	13.5	29.1	63	19.9	.72	9.39	2.29	.805	15.9	.066	.97	12.53	3.07	.490

ID = BTDC

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-14 07-13-76 MODE 2 200 ECU POT NO EGR 19-3B BTDC K= 1.079 HUM= 15.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CRW	VAC. MM
1	2000	80	.035	12.62	230	12.564	10392	7	59	63	7.3	59	67.8	18.0	295
2	2000	80	.056	12.25	250	12.315	9299	7	86	63	6.7	86	67.6	18.0	328
3	2000	80	.077	12.12	250	12.206	8759	6	117	60	6.9	117	69.2	18.0	343
4	2000	120	.109	11.99	240	12.107	8381	9	166	59	9.1	166	63.8	18.0	351
5	2000	140	.131	11.99	230	12.139	8079	12	176	73	11.8	176	78.6	18.0	363
6	2000	210	.197	11.86	200	12.031	7953	15	198	88	15.5	198	95.1	18.0	371
7	2000	300	.159	11.61	215	11.882	7867	22	213	92	22.1	213	98.9	18.0	373

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- NV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	19	11.6	29.1	63	22.8	.31	2.99	2.66	.997	17.6	.057	.92	3.39	3.57	.576
2	18	12.9	29.1	63	20.5	.29	3.62	2.65	.851	17.9	.056	.38	9.86	3.56	.518
3	22	13.5	29.1	63	19.3	.22	4.72	2.52	.801	18.1	.055	.36	6.39	3.38	.487
4	24	13.8	29.1	63	18.3	.39	6.08	2.51	.760	18.2	.055	.52	8.16	3.36	.462
5	30	14.3	29.1	63	17.8	.58	7.95	3.09	.739	18.2	.055	.67	9.99	4.19	.450
6	36	14.6	29.1	63	17.6	.66	8.37	3.73	.731	18.3	.055	.88	11.23	5.01	.444
7	38	14.7	29.1	63	17.3	.96	9.82	3.88	.718	18.7	.054	1.26	12.18	5.20	.437

ID = BTDC

TABLE E-21.STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-15 07-17-76 MODE 5 350 ECU POT NO EGR 14-32 BTDC K= 1.079 HUM= 15.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. HH
1	2000	45	.050	13.64	213	13.688	2039	9	99	38	9.0	99	41.5	7.2	919
2	2000	75	.056	12.93	210	12.995	4532	9	57	35	9.2	57	37.8	7.2	992
3	2000	250	.082	12.79	208	12.900	6033	13	78	32	13.1	78	34.8	7.2	957
4	2000	450	.115	12.52	188	12.685	5806	23	106	29	23.0	106	30.8	7.2	970

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- NV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	19	16.5	9.7	26	16.9	.92	9.67	9.89	1.689	16.2	.062	.56	6.26	5.91	1.027
2	28	17.9	9.7	26	19.9	.99	5.98	3.68	1.983	17.0	.059	.59	8.02	9.99	.902
3	26	18.0	9.7	26	13.3	1.37	8.17	3.39	1.369	17.2	.058	1.89	10.95	9.55	.833
4	32	19.5	9.7	26	17.8	2.92	11.12	3.88	1.318	17.9	.057	3.29	19.91	9.02	.802

ID = BTDC

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-EGR RUN-DIST 07-12-76 MODE 1 CYL 1-8 190 ECU POT 8.9 EGR K= 1.092 HUM= 16.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. HH
1	2000	5890	.257	13.21	550	19.129	15286	711	542	198	710.8	562	216.9	39.6	192
2	2000	2360	.300	15.02	575	15.589	15286	269	599	187	269.2	599	205.9	39.6	192
3	2000	580	.197	19.39	600	19.599	15286	59	312	209	59.9	312	229.8	39.6	192
4	2000	300	.193	19.70	637	19.927	15286	35	398	217	35.0	398	237.7	39.6	192
5	2000	160	.109	19.39	699	19.512	15286	19	221	249	19.1	221	269.2	39.6	192
6	2000	530	.181	19.70	674	19.991	15286	62	379	229	61.7	379	251.2	39.6	192
7	2000	1880	.153	19.23	588	19.696	15286	223	329	209	223.1	329	229.9	39.6	192
8	2000	3290	.170	13.69	729	19.175	15286	399	370	259	399.0	370	289.9	39.6	192

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- NV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1		5.6	53.1	139	33.7	13.53	10.70	3.74	.639	15.4	.069	18.19	19.39	5.09	.386
2		5.6	53.1	139	33.7	5.03	11.30	3.56	.639	19.3	.020	6.79	15.15	9.78	.386
3		5.6	53.1	139	33.7	1.13	5.99	3.97	.639	15.3	.066	1.52	7.96	5.32	.386
4		5.6	53.1	139	33.7	.67	7.58	9.12	.639	19.9	.067	.89	10.17	5.53	.386
5		5.6	53.1	139	33.7	.36	9.20	9.65	.639	15.9	.065	.99	5.63	6.29	.386
6		5.6	53.1	139	33.7	1.17	7.13	9.36	.639	19.9	.067	1.57	9.56	5.89	.386
7		5.6	53.1	139	33.7	9.25	6.16	3.89	.639	15.2	.066	5.49	8.26	5.22	.386
8		5.6	53.1	139	33.7	7.50	7.09	9.93	.639	15.4	.069	10.05	9.99	6.61	.386

ID =

TABLE E-22. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-216 RUN-1 07-19-76 HFI-19 BTDC AT 2000 250 ECU POT PL HD AIR K= 1.098 HUM= 17.0 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. IN
1 IDLE	1850	1.907	13.35	58	19.967	2223	31	922	3	.232	7.2	98	.7	0.0	994
2 25 PCT T	110	.088	13.69	900	13.770	9980	9	122	101	.077	.7	9	7.7	17.9	356
3 55 PCT T	205	.192	13.93	1207	14.095	19197	23	289	993	.197	3.9	92	65.1	38.5	208
4 25 PCT T	90	.056	13.78	990	13.891	9389	3	77	109	.077	.2	6	8.9	17.3	356
5 10 PCT T	20	.035	13.21	185	13.298	7121	1	38	36	.057	.1	2	2.1	6.6	929
6 25 PCT T	30	.056	13.08	965	13.139	9935	2	76	113	.077	.2	6	8.7	17.3	353
7 90 PCT T	2120	3.600	12.79	968	14.639	20954	308	9141	999	.113	39.8	1035	50.2	63.7	89
8 25 PCT T	35	.096	13.93	965	13.980	9399	3	42	113	.077	.2	5	8.7	17.9	356
9 C.T.	28800	.263	5.92	9	8.719	907	316	55	0	.193	95.1	8	.0	0.0	612
1 IDLE	2560	1.539	13.35	59	15.180	1950	37	399	2	.232	8.7	93	.5	0.0	950
2 25 PCT T	200	.082	13.78	900	13.885	9980	15	119	100	.077	1.2	9	7.7	17.9	356
3 55 PCT T	260	.197	14.39	1277	14.567	19107	29	289	951	.197	4.2	92	66.3	38.5	208
4 25 PCT T	90	.056	13.93	950	13.996	9117	7	74	107	.077	.5	6	8.2	17.1	356
5 10 PCT T	60	.035	13.99	180	13.532	6985	3	37	34	.057	.2	2	1.9	6.6	929
6 25 PCT T	60	.056	14.23	320	14.293	9253	9	73	87	.077	.3	6	6.7	17.2	356
7 90 PCT T	2080	3.650	12.65	968	14.539	20775	301	9261	993	.113	39.0	1096	50.1	62.9	89
8 25 PCT T	60	.096	14.08	500	14.132	9299	9	61	120	.077	.3	5	9.2	17.2	356
9 C.T.	28800	.217	9.72	11	7.998	907	399	50	0	.193	99.2	7	.1	0.0	612

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CMP	CTQ	FC	BSFC	BSNOX	SFC F/A	KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.5	0.0	0	9.9	0	0	.068	0	670	14.7	7.9	8.1	.9	6.1	0.0
2 25 PCT T	14.0	23.3	62	20.9	.897	9.3	.062	.595	1960	16.2	.7	.8	5.1	8.7	7.2
3 55 PCT T	8.2	51.6	137	31.3	.604	8.6	.063	.369	1980	15.8	3.7	3.5	92.9	29.8	30.5
4 25 PCT T	14.0	23.2	63	20.7	.891	9.7	.062	.592	1950	16.1	.3	.5	5.5	8.6	7.2
5 10 PCT T	16.7	8.9	29	15.7	1.762	9.1	.060	1.072	1930	16.7	.1	.2	1.9	9.8	2.0
6 25 PCT T	13.9	23.2	63	20.8	.898	9.9	.064	.596	1990	15.7	.2	.5	5.7	8.6	7.2
7 90 PCT T	3.5	85.5	229	94.2	.591	5.3	.077	.329	2000	13.1	37.8	85.9	33.1	28.2	38.8
8 25 PCT T	14.0	23.3	63	20.6	.889	9.9	.063	.538	1950	15.9	.2	.9	5.7	8.6	7.2
9 C.T.	29.1	0.0	0	2.0	0	0	.042	0	2000	23.9	99.1	.7	.0	1.5	0.0
1 IDLE	17.7	0.0	0	9.3	0	0	.069	0	630	14.5	9.8	7.6	.9	5.5	0.0
2 25 PCT T	14.0	23.3	63	20.9	.896	9.3	.062	.595	1950	16.0	1.2	.7	5.1	8.8	7.3
3 55 PCT T	8.2	51.6	137	31.1	.603	8.8	.065	.367	1970	15.3	4.3	3.5	99.0	25.1	30.7
4 25 PCT T	14.0	22.9	63	20.1	.876	9.7	.063	.533	1920	15.9	.5	.5	5.5	8.5	7.1
5 10 PCT T	16.7	8.8	29	15.9	1.753	3.9	.061	1.044	1900	16.9	.2	.2	1.3	9.8	2.0
6 25 PCT T	14.0	23.1	63	20.9	.889	3.8	.069	.538	1930	15.6	.3	.5	9.5	8.6	7.2
7 90 PCT T	3.5	89.3	225	95.8	.593	5.3	.076	.330	1970	13.1	39.5	84.1	33.2	28.9	38.5
8 25 PCT T	14.0	23.1	63	20.5	.888	5.3	.063	.590	1930	15.8	.3	.9	6.1	8.7	7.2
9 C.T.	29.1	0.0	0	2.0	0	0	.038	0	2000	26.1	99.9	.6	.0	1.6	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 5.0 66 8.2

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 5.9 67 8.3

TWO CYCLE COMPOSITE -

HC- FID 0.35(5.0) + 0.65(5.9) = 5.265 G/KW HR (3.926 BS)

CO- NDIR 0.35(65.8) + 0.65(66.7) = 66.911 G/KW HR (49.523 BS)

NOX-CL 0.35(8.2) + 0.65(8.3) = 8.262 G/KW HR (6.161 BS)

HC + NOX = 13.527 G/KW HR (10.087 BS)

SFC = .950 KG/KW HR (.739 BS)

TABLE E-23. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HO ENGINE---PROJECT 11-9311

ENGINE-2 TEST-214 RUN-2 07-19-76 HFI-19 PLUS VAC ADV 250 FCU PCT PL HO AIR K= 1.101 HUM= 17.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	2190	2.250	12.38	99	19.873	1950	32	596	2	.232	7.9	138	.5	0.0	997
2 25 PCT T	900	.153	13.35	890	13.598	2802	26	178	177	.077	2.0	14	13.6	17.3	909
3 55 PCT T	1090	.217	13.93	2630	19.269	12202	101	374	822	.197	19.8	55	120.9	38.3	269
4 25 PCT T	280	.192	13.35	895	13.523	7466	18	142	185	.077	1.9	13	19.3	17.3	909
5 10 PCT T	130	.115	12.65	210	12.779	5670	6	103	39	.057	.9	6	1.9	6.6	970
6 25 PCT T	280	.197	13.35	920	13.529	7756	18	171	193	.077	1.9	13	19.8	17.9	909
7 90 PCT T	2290	4.070	12.25	285	16.578	21436	336	10730	375	.113	38.0	1212	42.3	63.5	89
8 25 PCT T	195	.136	13.99	980	13.498	7620	12	159	208	.077	.9	12	15.9	17.3	909
9 C.T.	29960	.251	9.72	14	7.582	907	317	41	1	.193	99.7	9	.1	0.0	612
1 IDLE	2990	1.450	12.93	50	19.857	1860	35	917	2	.232	8.0	97	.5	0.0	997
2 25 PCT T	590	.153	13.35	920	13.569	7620	39	179	189	.077	2.6	13	19.6	16.6	909
3 55 PCT T	1100	.209	13.69	2669	13.968	11929	106	352	833	.197	15.6	52	122.5	37.8	269
4 25 PCT T	320	.197	13.99	920	13.679	7530	20	169	185	.077	1.5	13	19.3	16.6	909
5 10 PCT T	170	.115	12.52	195	12.653	5715	9	109	32	.057	.5	6	1.8	6.6	970
6 25 PCT T	300	.197	13.99	950	13.671	7664	19	167	195	.077	1.5	13	15.0	16.6	906
7 90 PCT T	2140	3.910	12.38	835	16.539	21273	320	10159	393	.113	36.1	1198	99.9	63.0	89
8 25 PCT T	225	.192	13.35	1028	13.517	7530	19	140	209	.077	1.1	12	16.1	17.2	909
9 C.T.	25600	.275	9.59	15	7.590	953	338	78	1	.193	98.3	10	.1	0.0	612

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- NV	CHP	CID	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	17.6	0.0	0	9.3	0	0	.068	0	600	19.7	6.7	9.9	.2	6.0	0.0
2 25 PCT T	14.1	23.2	63	17.2	.791	7.7	.061	.951	1950	16.9	1.8	.9	6.1	8.0	7.2
3 55 PCT T	10.4	51.9	137	26.9	.523	14.1	.069	.318	1970	15.6	13.9	3.7	59.0	23.9	30.9
4 25 PCT T	14.1	23.2	62	16.9	.729	8.1	.061	.993	1950	16.9	1.2	.9	6.9	7.9	7.2
5 10 PCT T	18.5	8.8	24	12.5	1.419	3.9	.058	.860	1920	17.3	.7	.9	.9	4.3	2.0
6 25 PCT T	14.1	23.3	62	17.1	.739	8.3	.061	.996	1960	16.9	1.3	.9	6.6	7.9	7.2
7 90 PCT T	3.9	85.2	229	42.3	.566	9.9	.077	.391	2000	13.0	39.3	82.9	18.9	32.5	38.7
8 25 PCT T	14.1	23.2	63	16.8	.723	8.7	.061	.990	1950	16.3	.9	.8	6.9	7.8	7.2
9 C.T.	29.1	0.0	0	9.0	0	0	.034	0	2000	27.9	90.3	.6	.0	1.7	0.0
1 IDLE	17.6	0.0	0	9.1	0	0	.068	0	600	19.8	7.0	7.1	.2	5.8	0.0
2 25 PCT T	14.1	22.3	61	16.8	.755	8.6	.061	.959	1930	16.3	2.3	1.0	6.3	7.9	7.0
3 55 PCT T	10.6	50.7	137	26.3	.519	14.6	.063	.316	1990	15.9	13.5	3.8	53.9	23.7	30.5
4 25 PCT T	14.1	22.3	61	16.4	.734	8.9	.062	.959	1930	16.2	1.3	.9	6.2	7.8	7.0
5 10 PCT T	18.5	8.9	24	12.6	1.423	3.7	.057	.866	1920	17.5	.9	.9	.8	4.4	2.1
6 25 PCT T	14.0	22.3	61	16.9	.759	8.8	.062	.962	1930	16.2	1.3	.9	6.5	8.0	7.0
7 90 PCT T	3.9	84.5	229	96.9	.555	9.7	.076	.338	1980	13.1	31.3	89.2	19.9	32.5	39.1
8 25 PCT T	14.1	23.0	63	16.6	.721	9.2	.061	.939	1930	16.9	.9	.9	7.0	7.8	7.3
9 C.T.	29.1	0.0	0	9.1	0	0	.036	0	2000	27.6	91.9	.7	.0	1.8	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 6.0 80 12.2

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 6.9 76 12.7

TWO CYCLE COMPOSITE -

HC- FID 0.35(6.0) + 0.65(6.9) = 6.266 G/KW HR (9.672 RS)

CO- NDIR 0.35(80.1) + 0.65(75.6) = 77.140 G/KW HR (57.538 RS)

NOx-CL 0.35(12.2) + 0.65(12.7) = 12.524 G/KW HR (9.390 RS)

HC + NOX = 18.791 G/KW HR (19.013 RS)

SFC = .906 KG/KW HR (.667 RS)

TABLE E-24. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-217 RUN-1 07-19-74 MODALLY OPTIMIZED EFI-MFI HVA-EGR-PL MAIR K= 1.007 HUM= 16.0 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	680	.356	9.22	29	9.650	1592	12	115	2	.232	2.7	27	.9	0.0	583
2 25 PCT T	590	.738	11.12	330	11.918	8528	93	1067	59	.077	3.3	82	4.6	17.8	901
3 55 PCT T	950	.882	11.86	525	12.792	13517	53	1882	219	.197	7.8	277	32.2	38.9	239
4 25 PCT T	235	.583	11.34	195	11.969	8301	18	817	99	.077	1.4	63	3.8	17.9	901
5 10 PCT T	235	.120	9.22	340	9.365	5352	15	138	70	.057	.8	8	4.0	7.2	998
6 25 PCT T	290	.525	11.29	230	11.796	8396	22	751	59	.077	1.7	58	4.5	18.0	399
7 90 PCT T	70	.306	19.59	670	19.859	20598	11	855	335	.113	1.2	97	37.8	65.9	69
8 25 PCT T	100	.902	11.41	275	12.023	8937	8	569	70	.077	.6	44	5.4	18.1	391
9 C.T.	7340	.005	.19	15	.932	0	0	0	0	.193	0.0	0	0.0	0.0	627
1 IDLE	1320	.181	8.91	35	9.239	1592	29	61	2	.232	5.5	14	.5	0.0	516
2 25 PCT T	510	.598	11.12	235	11.775	8528	91	875	61	.077	3.2	67	4.7	18.0	396
3 55 PCT T	560	.995	11.99	580	12.992	13109	63	1929	211	.197	9.3	283	31.0	39.8	239
4 25 PCT T	275	.561	11.29	235	11.832	8482	22	813	61	.077	1.7	63	4.7	17.9	381
5 10 PCT T	260	.109	9.22	310	9.357	5171	16	122	62	.057	.9	7	3.5	7.2	500
6 25 PCT T	300	.490	11.29	295	11.763	8255	23	699	62	.077	1.8	53	4.8	17.9	399
7 90 PCT T	100	.369	19.59	615	19.920	20321	15	1015	302	.113	1.8	115	34.2	65.9	66
8 25 PCT T	115	.928	11.49	235	11.921	8396	9	606	59	.077	.7	47	4.6	17.9	399
9 C.T.	7890	.020	.19	15	.996	0	0	0	0	.193	0.0	0	0.0	0.0	627

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	19.8	0.0	0	3.9	0	0	.099	0	600	22.5	19.0	9.1	.9	9.2	0.0
2 25 PCT T	15.8	23.8	63	18.8	.798	2.5	.059	.980	2000	18.9	16.8	12.6	9.9	8.7	7.2
3 55 PCT T	9.9	52.2	136	29.8	.571	9.3	.058	.398	2020	17.2	39.8	92.3	39.8	26.3	29.9
4 25 PCT T	15.8	24.1	63	18.3	.761	2.1	.055	.963	2010	18.3	7.1	9.6	9.1	8.5	7.2
5 10 PCT T	19.6	9.7	25	11.8	1.222	7.9	.093	.793	2000	23.3	9.2	1.2	9.3	9.0	2.1
6 25 PCT T	15.7	24.2	63	18.9	.760	2.5	.059	.963	2020	18.6	8.6	8.8	9.9	8.5	7.3
7 90 PCT T	2.7	88.3	225	95.3	.513	3.8	.067	.312	2060	15.0	6.3	19.8	98.8	30.7	39.8
8 25 PCT T	15.9	29.2	63	18.6	.767	2.9	.055	.967	2020	18.3	3.1	6.7	5.8	8.6	7.3
9 C.T.	29.7	0.0	0	0.0	I	I	.009	I	2000	223.0	0.0	0.0	0.0	0.0	0.0
1 IDLE	20.3	0.0	0	3.9	0	0	.092	0	600	23.5	22.9	2.2	.6	9.8	0.0
2 25 PCT T	15.6	24.1	63	18.9	.780	2.6	.059	.975	2010	18.6	12.7	10.9	5.9	8.8	7.2
3 55 PCT T	9.2	53.9	138	28.9	.591	9.0	.059	.329	2030	16.9	37.5	93.6	35.3	25.8	30.5
4 25 PCT T	15.8	24.0	63	18.7	.780	2.6	.059	.979	2000	18.5	6.8	9.6	5.3	8.8	7.2
5 10 PCT T	19.7	9.6	25	11.9	1.185	6.5	.093	.721	1990	23.3	3.6	1.1	9.0	3.9	2.1
6 25 PCT T	15.7	24.0	63	18.2	.758	2.6	.059	.961	2000	18.7	7.2	8.2	5.9	8.5	7.2
7 90 PCT T	2.6	87.6	224	99.8	.511	3.5	.067	.311	2090	19.9	7.1	17.7	38.8	30.8	38.5
8 25 PCT T	15.7	24.0	63	18.9	.765	2.5	.059	.966	2000	18.9	2.8	7.2	5.2	8.6	7.2
9 C.T.	24.7	0.0	0	0.0	I	I	.005	I	2000	208.7	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 1.0 35 9.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 1.3 39 9.7

TWO CYCLE COMPOSITE -

HC- FID	0.35(1.0)	+ 0.65(	1.3) =	1.219	G/KW HR	(.909 GS)
CO- NDIR	0.35(39.7)	+ 0.65(	39.9) =	39.817	G/KW HR	(29.739 GS)
NOX-CL	0.35(9.9)	+ 0.65(	9.7) =	9.759	G/KW HR	(3.595 GS)
			HC + NOX =	5.973	G/KW HR	(4.459 GS)
			SFC =	.392	KG/KW HR	(.699 GS)

Table E-24 (Cont'd.)

Test 217, Run 1, MODAL TEST CONDITIONS

Mode	Air Inj.	EGR,* %	Air/** Fuel	Fuel** /Air
1 (idle)	ON	0.0	14.5	.066
2 (25%)	ON	15.4	13.9	.072
3 (55%)	ON	14.0	14.0	.071
4 (25%)	ON	15.4	13.6	.074
5 (10%)	ON	0.0	15.7	.064
6 (25%)	ON	15.4	13.7	.073
7 (90%)	ON	6.6	13.2	.076
8 (25%)	ON	15.4	13.7	.073
9 (CT)	OFF	0.0	∞	0.0

Reference Conditions***

	ECO_2	ICO_2	EGR	EFI
1	---	---	0.0	250
2, 4, 6, & 8	12.86	1.83	1.0	200
3	13.49	1.73	2.5	180
5	---	---	0.0	350
7	11.99	0.76	2.5	150
9	---	---	0.0	OFF

ECO_2 & ICO_2 - Exhaust CO_2 and Intake CO_2 in %
Background CO_2 = 0.06%

$$* \text{ EGR } \% = \frac{CO_2 \text{ Intake} - CO_2 \text{ background}}{CO_2 \text{ Exhaust}} * \frac{100 - CO_2 \text{ Intake}}{100 - CO_2 \text{ Exhaust}} * 100$$

** Using the equation in the recommended procedure - data obtained with air injection system cut off

*** These reference conditions are specific to the systems used and, with the exception of CO_2, only serve to document the settings for possible future use.

TABLE E-25. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-217 RUN-3 02-19-76 MODALLY OPTIMIZED EFI-HEI MVA-EGR-PL MAIR K= 1.072 HUM= 19.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	750	.755	9.93	30	10.267	1592	12	229	2	.232	2.9	53	.9	0.0	972
2 25 PCT T	500	.120	10.30	390	10.975	8391	99	196	92	.077	3.9	15	7.5	17.8	366
3 55 PCT T	575	.170	11.98	700	11.719	12882	70	377	279	.197	10.3	55	90.3	39.1	206
4 25 PCT T	390	.131	9.22	275	9.388	7256	31	218	81	.077	2.9	17	6.2	17.8	386
5 10 PCT T	210	.098	9.01	295	9.131	5171	13	112	59	.057	.7	6	3.9	7.1	500
6 25 PCT T	390	.131	10.30	290	10.973	8119	32	205	80	.077	2.5	16	6.2	17.9	381
7 90 PCT T	125	.651	13.69	235	19.305	20230	20	1860	320	.113	2.3	210	91.8	69.7	66
8 25 PCT T	210	.192	10.91	295	10.575	7802	17	211	77	.077	1.3	16	6.0	17.9	386
9 C.T.	8720	.020	.09	10	.933	0	0	0	0	.193	0.0	0	0.0	0.0	627
1 IDLE	980	.928	9.69	30	10.175	1997	16	127	2	.232	3.7	30	.9	0.0	978
2 25 PCT T	520	.136	10.30	305	10.993	8029	99	211	83	.077	3.9	16	6.9	17.9	381
3 55 PCT T	615	.217	10.69	720	10.924	12655	78	507	318	.197	11.5	75	96.7	39.3	213
4 25 PCT T	375	.192	10.53	285	10.713	7938	31	212	75	.077	2.9	16	5.8	17.9	391
5 10 PCT T	260	.093	8.81	310	8.931	5307	17	112	66	.057	1.0	6	3.7	7.2	500
6 25 PCT T	910	.192	10.53	285	10.717	8119	39	217	77	.077	2.6	17	5.9	17.9	381
7 90 PCT T	150	.613	13.69	790	19.270	20321	29	1769	375	.113	2.7	199	92.9	65.1	66
8 25 PCT T	290	.192	10.30	270	10.979	8990	27	293	82	.077	2.1	19	6.3	17.3	391
9 C.T.	8900	.015	.19	10	1.092	0	0	0	0	.193	0.0	0	0.0	0.0	630

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL--------- HC	CO	NOx	FUEL	POWER
1 IDLE	18.6	0.0	0	3.9	R	R	.097	R	600	21.2	11.1	13.7	.3	9.9	0.0
2 25 PCT T	19.9	23.9	63	18.5	.779	9.1	.098	.971	2000	20.9	13.2	3.8	6.7	8.8	7.2
3 55 PCT T	8.1	52.5	138	28.9	.591	5.3	.053	.329	2000	18.8	90.1	19.3	36.1	25.9	30.3
4 25 PCT T	15.2	23.9	63	17.1	.719	9.9	.093	.935	2000	23.2	9.2	9.3	5.6	8.2	7.2
5 10 PCT T	19.7	9.5	25	11.9	1.197	6.3	.092	.728	1970	23.8	2.9	1.6	3.0	9.0	2.1
6 25 PCT T	15.0	29.0	63	17.9	.797	9.9	.098	.959	2000	20.9	9.7	9.1	5.5	8.6	7.3
7 90 PCT T	2.6	86.8	226	99.6	.519	9.3	.065	.313	2020	15.5	8.8	59.0	37.9	31.3	38.5
8 25 PCT T	15.2	29.0	63	17.2	.714	9.3	.098	.936	2000	20.7	5.1	9.2	5.3	8.2	7.3
9 C.T.	29.7	0.0	0	0.0	I	I	.009	I	2000	222.5	0.0	0.0	0.0	0.0	0.0
1 IDLE	18.8	0.0	0	3.3	R	R	.097	R	600	21.9	12.5	7.8	.3	9.7	0.0
2 25 PCT T	15.0	29.0	63	17.7	.736	9.5	.098	.998	2000	20.9	11.5	9.3	5.9	8.9	7.3
3 55 PCT T	8.9	52.7	138	27.9	.529	6.1	.050	.322	2000	20.1	39.9	19.7	39.7	25.3	30.9
4 25 PCT T	15.9	29.0	63	17.5	.728	9.2	.099	.993	2000	20.5	8.0	9.3	9.9	8.3	7.3
5 10 PCT T	19.7	9.7	25	11.7	1.206	6.9	.091	.733	2000	24.9	3.9	1.7	3.2	9.1	2.2
6 25 PCT T	15.0	29.0	63	17.9	.795	9.3	.099	.953	2000	20.9	9.0	9.9	5.0	8.5	7.3
7 90 PCT T	2.4	87.3	224	99.8	.513	9.9	.069	.312	2030	15.5	9.3	52.8	36.1	31.3	38.7
8 25 PCT T	15.9	23.2	61	19.6	.893	9.6	.098	.913	2000	20.9	7.1	5.0	5.3	9.3	7.0
9 C.T.	29.8	0.0	0	0.0	I	I	.005	I	2000	198.5	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 1.9 21 6.0

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 1.6 20 6.3

TWO CYCLE COMPOSITE -

HC- FID	0.35(1.9) + 0.65(1.6) =	1.699	G/KW HR	(1.118 GS)
CO- NDIR	0.35(20.8) + 0.65(20.2) =	20.421	G/KW HR	(15.228 GS)
NOX-CL	0.35(6.0) + 0.65(6.3) =	6.179	G/KW HR	(9.608 GS)
	HC + NOx =	7.878	G/KW HR	(5.726 GS)
	SFC =	.386	KG/KW HR	(.639 GS)

Table E-25 (Cont'd.)

Test 217, Run 3, MODAL TEST CONDITIONS

Mode	Air Inj.	EGR,* %	Air/** Fuel	Fuel**/Air
1 (idle)	ON	0.0	14.1	.071
2 (25%)	ON	14.5	14.9	.067
3 (55%)	ON	13.0	14.9	.067
4 (25%)	ON	14.5	15.0	.067
5 (10%)	ON	0.0	15.6	.064
6 (25%)	ON	14.5	14.9	.067
7 (90%)	ON	6.0	13.1	.076
8 (25%)	ON	14.5	15.0	.067
9 'CT)	OFF	0.0	∞	0.0

Reference Conditions***

	ECO_2	ICO_2	EGR	EFI
1	----	----	0.0	250
2, 4, 6, & 8	14.31	1.88	1.0	260
3	14.23	1.69	2.5	220
5	----	----	0.0	350
7	11.86	0.71	2.5	150
9	----	----	0.0	OFF

ECO_2 & ICO_2 - Exhaust CO_2 and Intake CO_2 in %
Background CO_2 = 0.06%

$$* \text{ EGR } \% = \frac{CO_2 \text{ Intake} - CO_2 \text{ background}}{CO_2 \text{ Exhaust}} * \frac{100 - CO_2 \text{ Intake}}{100 - CO_2 \text{ Exhaust}} * 100$$

** Using the equation in the recommended procedure - data obtained with air injection system cut off

*** These reference conditions are specific to the systems used and, with the exception of CO_2, only serve to document the settings for possible future use.

TABLE E-26. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-217 RUN-5 07-21-76 MODALLY OPTIMIZED EFI-MFI MVA-EGR-PL MAIR K= 1.091 HUM= 14.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	515	.369	9.53	28	9.955	1729	10	139	2	.232	2.3	30	.9	0.0	975
2 25 PCT T	990	.992	10.88	285	11.370	8981	38	705	82	.077	3.0	54	6.3	18.6	381
3 55 PCT T	610	.382	11.86	680	12.310	13381	74	839	268	.197	10.9	123	39.9	39.3	216
4 25 PCT T	265	.525	11.12	260	11.675	8573	22	779	69	.077	1.7	60	5.3	17.7	389
5 10 PCT T	180	.197	13.49	390	13.658	5398	8	118	56	.057	.5	7	3.2	7.1	505
6 25 PCT T	260	.968	11.00	255	11.993	8573	21	705	69	.077	1.7	54	5.3	17.8	389
7 90 PCT T	130	.856	13.69	425	14.510	20593	21	2953	321	.113	2.9	377	36.3	64.9	61
8 25 PCT T	100	.968	11.12	270	11.599	8301	8	677	70	.077	.6	52	5.9	17.7	391
9 C.T.	8320	.015	.15	5	.998	0	0	0	0	.193	0.0	0	0.0	0.0	625
1 IDLE	690	.239	9.32	30	9.439	1678	13	89	2	.232	3.0	20	.9	0.0	975
2 25 PCT T	970	.569	11.00	295	11.621	8573	38	847	79	.077	3.0	65	6.1	17.8	399
3 55 PCT T	615	.559	11.99	625	12.613	12882	70	1193	250	.197	10.3	168	36.7	39.3	229
4 25 PCT T	265	.559	11.12	225	11.703	8255	21	799	58	.077	1.6	61	4.9	17.7	398
5 10 PCT T	250	.149	13.93	535	14.122	5715	11	139	78	.057	.7	8	4.5	7.5	495
6 25 PCT T	270	.955	11.00	235	11.985	8528	22	693	63	.077	1.7	53	4.9	17.8	396
7 90 PCT T	190	.838	13.78	580	14.439	20865	23	2915	300	.113	2.6	333	33.9	65.2	61
8 25 PCT T	125	.955	11.12	225	11.589	7983	10	639	56	.077	.7	99	4.3	17.1	901
9 C.T.	7520	.015	.15	5	.918	0	0	0	0	.193	0.0	0	0.0	0.0	625

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 IDLE	18.7	0.0	0	3.8	R	R	.056	R	600	21.9	9.9	9.6	.9	5.2	0.0
2 25 PCT T	15.0	29.9	65	19.8	.299	3.3	.052	.993	2000	19.3	13.0	8.3	4.2	9.0	7.5
3 55 PCT T	8.5	52.7	137	29.5	.560	5.1	.056	.391	2020	17.9	97.6	18.7	38.8	25.7	30.9
4 25 PCT T	15.3	23.8	62	18.9	.795	2.9	.053	.983	2000	18.8	7.3	9.1	5.2	8.6	7.2
5 10 PCT T	19.9	9.5	25	11.9	1.259	5.9	.062	.742	1990	16.3	2.0	1.0	3.1	9.0	2.1
6 25 PCT T	15.3	23.9	63	18.9	.791	2.9	.052	.981	2000	19.1	7.2	8.3	5.2	8.6	7.2
7 90 PCT T	2.9	86.9	225	95.9	.525	3.8	.066	.320	2020	15.3	10.9	92.1	35.8	30.9	38.3
8 25 PCT T	15.9	23.8	63	18.3	.770	3.0	.053	.968	1990	18.9	2.7	7.9	5.3	8.9	7.2
9 C.T.	29.6	0.0	0	0.0	I	I	.005	I	2000	208.0	0.0	0.0	0.0	0.0	0.0
1 IDLE	18.7	0.0	0	3.7	R	R	.049	R	600	22.6	17.9	2.8	.5	5.2	0.0
2 25 PCT T	15.5	23.9	63	18.9	.791	3.3	.053	.981	2000	18.9	12.6	9.9	6.9	8.8	7.2
3 55 PCT T	8.8	52.7	138	28.9	.539	4.8	.057	.328	2010	17.9	93.8	29.2	38.6	25.1	30.9
4 25 PCT T	15.6	23.8	63	18.2	.766	2.9	.053	.966	1990	18.7	6.8	8.7	4.7	8.9	7.2
5 10 PCT T	19.5	10.0	26	12.6	1.254	7.9	.064	.769	2000	15.7	2.8	1.1	4.7	9.3	2.2
6 25 PCT T	15.6	23.9	63	18.8	.786	2.7	.052	.978	2000	19.1	7.3	7.6	5.1	8.7	7.2
7 90 PCT T	2.9	87.9	225	94.0	.524	3.5	.066	.320	2090	15.1	10.9	39.2	35.6	31.3	38.8
8 25 PCT T	15.8	22.9	61	17.6	.768	2.5	.053	.947	1980	18.9	3.1	7.0	4.5	8.2	6.9
9 C.T.	29.6	0.0	0	0.0	I	I	.009	I	2000	226.9	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------			1.2	35	5.9
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------			1.3	37	6.1
TWO CYCLE COMPOSITE -	HC- FID 0.35(1.2) + 0.65(1.3) =	1.290	G/KW HR	(.925 GR)	
	CO- NDIR 0.35(35.0) + 0.65(37.1) =	36.397	G/KW HR	(27.109 GR)	
	NOX-CL 0.35(5.9) + 0.65(5.1) =	5.189	G/KW HR	(3.870 GR)	
	HC + NOX =	6.930	G/KW HR	(5.795 GR)	
	SFC =	.399	KG/KW HR	(.656 GR)	

Table E-26 (Cont'd.)

Test 217, Run 5, MODAL TEST CONDITIONS

Mode	Air Inj.	EGR,* %	Air/** Fuel	Fuel**/Air
1 (idle)	ON	0.0	14.2	.070
2 (25%)	ON	15.3	14.1	.071
3 (55%)	ON	14.2	14.4	.069
4 (25%)	ON	15.3	14.0	.071
5 (10%)	OFF	0.0	16.1	.062
6 (25%)	ON	15.3	14.1	.071
7 (90%)	ON	6.7	13.6	.074
8 (25%)	ON	15.3	14.3	.070
9 (CT)	OFF	0.0	∞	0.0

Reference Conditions***

	ECO_2	ICO_2	EGR	EFI
1	----	----	0.0	250
2, 4, 6, & 8	13.21	1.86	1.0	250
3	13.78	1.78	2.5	200
5	----	----	0.0	350
7	12.12	0.79	2.5	150
9	----	----	0.0	OFF

ECO_2 & ICO_2 - Exhaust CO_2 and Intake CO_2 in %
Background CO_2 = 0.06%

$$* \text{ EGR \%} = \frac{CO_2 \text{ Intake} - CO_2 \text{ background}}{CO_2 \text{ Exhaust}} * \frac{100 - CO_2 \text{ Intake}}{100 - CO_2 \text{ Exhaust}} * 100$$

** Using the equation in the recommended procedure - data obtained with air injection system cut off

*** These reference conditions are specific to the systems used and, with the exception of CO_2, only serve to document the settings for possible future use.

TABLE E-27. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-217 RUN-1 07-23-76 AIR/FUEL RATIO CHECK FOR TEST 217 RUN 1 K= 1.091 HUM= 12.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CPM	VAC. MM
1	600	2656	2.590	12.12	-0	15.012	0	0	0	0	0.0	0	0.0	0.0	0
2	2000	1760	2.590	12.93	-0	15.721	0	0	0	0	0.0	0	0.0	17.8	0
3	2000	1728	2.170	13.35	-0	15.718	0	0	0	0	0.0	0	0.0	39.1	0
4	2000	1656	3.120	12.65	-0	15.983	0	0	0	0	0.0	0	0.0	17.8	0
5	2000	228	.198	13.93	-0	14.159	0	0	0	0	0.0	0	0.0	7.2	0
6	2000	1760	2.850	12.93	-0	15.982	0	0	0	0	0.0	0	0.0	17.8	0
7	2000	1872	3.910	12.35	-0	16.375	0	0	0	0	0.0	0	0.0	63.8	0
8	2000	1760	2.990	12.79	-0	15.932	0	0	0	0	0.0	0	0.0	17.8	0

MODE	ID	-------UNITS AS SPECIFIED IN THE 3-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1		-0.0	0.0	0	0.0	I	I	I	I	14.5	.069	I	I	I	I
2		-0.0	23.9	63	0.0	0.00	0.00	0.00	0.000	13.9	.072	0.00	0.00	0.00	0.000
3		-0.0	52.9	138	0.0	0.00	0.00	0.00	0.000	14.0	.072	0.00	0.00	0.00	0.000
4		-0.0	23.9	63	0.0	0.00	0.00	0.00	0.000	13.6	.073	0.00	0.00	0.00	0.000
5		-0.0	9.6	25	0.0	0.00	0.00	0.00	0.000	15.7	.064	0.00	0.00	0.00	0.000
6		-0.0	23.9	63	0.0	0.00	0.00	0.00	0.000	13.7	.073	0.00	0.00	0.00	0.000
7		-0.0	85.4	225	0.0	0.00	0.00	0.00	0.000	13.2	.076	0.00	0.00	0.00	0.000
8		-0.0	23.9	63	0.0	0.00	0.00	0.00	0.000	13.7	.073	0.00	0.00	0.00	0.000

ID =

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-217 RUN-3 07-23-76 AIR/FUEL RATIO CHECK FOR TEST 217 RUN 3 K= 1.091 HUM= 12.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CPM	VAC. MM
1	600	2672	2.990	12.12	-0	15.468	0	0	0	0	0.0	0	0.0	0.0	0
2	2000	912	.525	14.23	-0	14.859	0	0	0	0	0.0	0	0.0	17.8	0
3	2000	1296	.674	14.08	-0	14.902	0	0	0	0	0.0	0	0.0	39.1	0
4	2000	928	.613	14.08	-0	14.798	0	0	0	0	0.0	0	0.0	17.8	0
5	2000	172	.170	14.08	-0	14.269	0	0	0	0	0.0	0	0.0	7.2	0
6	2000	832	.559	14.23	-0	14.879	0	0	0	0	0.0	0	0.0	17.8	0
7	2000	1688	4.230	11.99	-0	15.933	0	0	0	0	0.0	0	0.0	63.8	0
8	2000	752	.532	14.23	-0	14.858	0	0	0	0	0.0	0	0.0	17.8	0

MODE	ID	-------UNITS AS SPECIFIED IN THE 3-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1		-0.0	0.0	0	0.0	I	I	I	I	14.1	.071	I	I	I	I
2		-0.0	23.9	63	0.0	0.00	0.00	0.00	0.000	14.9	.067	0.00	0.00	0.00	0.000
3		-0.0	52.5	138	0.0	0.00	0.00	0.00	0.000	14.9	.067	0.00	0.00	0.00	0.000
4		-0.0	23.9	63	0.0	0.00	0.00	0.00	0.000	15.0	.067	0.00	0.00	0.00	0.000
5		-0.0	9.7	25	0.0	0.00	0.00	0.00	0.000	15.6	.064	0.00	0.00	0.00	0.000
6		-0.0	23.9	63	0.0	0.00	0.00	0.00	0.000	14.9	.067	0.00	0.00	0.00	0.000
7		-0.0	85.9	225	0.0	0.00	0.00	0.00	0.000	13.1	.076	0.00	0.00	0.00	0.000
8		-0.0	29.0	63	0.0	0.00	0.00	0.00	0.000	15.0	.067	0.00	0.00	0.00	0.000

ID =

TABLE E-28. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-FID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-217 RUN-5 07-23-76 AIR/FUEL RATIO CHECK FOR TEST 217 RUN 5 K= 1.091 HUM= 12.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HP HC	CO	NO2	CORRECTED G/HP HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	2688	2.760	12.25	-0	15.316	0	0	0	0	0.0	0	0.0	0.0	0
2	2000	1584	2.020	13.35	-0	15.551	0	0	0	0	0.0	0	0.0	17.9	0
3	2000	1504	1.350	13.78	-0	15.702	0	0	0	0	0.0	0	0.0	34.2	0
4	2000	1600	2.390	13.07	-0	15.633	0	0	0	0	0.0	0	0.0	17.9	0
5	2000	160	.098	13.66	-0	13.756	0	0	0	0	0.0	0	0.0	7.2	0
6	2000	1600	2.250	13.07	-0	15.503	0	0	0	0	0.0	0	0.0	17.9	0
7	2000	1792	3.450	12.12	-0	15.476	0	0	0	0	0.0	0	0.0	43.9	0
8	2000	1504	2.190	13.07	-0	15.382	0	0	0	0	0.0	0	0.0	17.9	0

MODE	ID	----------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---------- HV	CHP	CID	FC	RSHC	RSCO	RSNOX	RSFC	---CALC--- A/F	F/A	---------G/KW HR--------- HC	CO	NOX	SFC KG/KW HR
1		-0.0	0.0	0	0.0	I	I	I	I	14.2	.070	I	I	I	I
2		-0.0	29.0	63	0.0	0.00	0.00	0.00	0.000	14.1	.071	0.00	0.00	0.00	0.000
3		-0.0	52.5	138	0.0	0.00	0.00	0.00	0.000	14.9	.069	0.00	0.00	0.00	0.000
4		-0.0	29.0	63	0.0	0.00	0.00	0.00	0.000	14.0	.071	0.00	0.00	0.00	0.000
5		-0.0	9.7	25	0.0	0.00	0.00	0.00	0.000	16.1	.062	0.00	0.00	0.00	0.000
6		-0.0	29.0	63	0.0	0.00	0.00	0.00	0.000	14.1	.071	0.00	0.00	0.00	0.000
7		-0.0	85.7	225	0.0	0.00	0.00	0.00	0.000	13.6	.074	0.00	0.00	0.00	0.000
8		-0.0	29.0	63	0.0	0.00	0.00	0.00	0.000	14.3	.070	0.00	0.00	0.00	0.000

ID =

TABLE E-29. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-218 RUN-1 07-21-76 MODALLY OPT FFI-HET HVA-FGR-PL MAIR-DECEL K= 1.073 HUM= 19.8 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	680	.974	9.53	24	10.080	1633	12	156	2	.232	2.8	36	.3	0.0	478
2 25 PCT T	480	.497	11.29	220	11.790	8800	40	749	58	.077	3.1	58	9.5	18.1	389
3 55 PCT T	485	.455	12.12	670	12.652	12927	78	990	299	.197	11.5	138	35.8	38.9	218
4 25 PCT T	305	.490	11.12	290	11.699	8119	29	690	60	.077	1.8	53	9.6	17.6	396
5 10 PCT T	205	.125	13.07	355	13.218	5988	10	105	53	.057	.5	6	3.0	6.8	490
6 25 PCT T	295	.428	11.29	235	11.701	8079	23	593	58	.077	1.7	46	9.9	17.9	396
7 90 PCT T	130	.891	13.78	645	14.695	20598	21	2517	321	.113	2.3	289	36.3	64.1	63
8 25 PCT T	150	.428	11.36	290	11.805	7893	11	578	57	.077	.9	45	9.9	17.5	401
9 C.T.	470	.125	12.25	100	12.428	9269	18	87	12	.193	2.6	12	1.7	0.0	531
1 IDLE	1090	.192	8.71	35	8.969	1588	20	51	2	.232	4.6	12	.5	0.0	521
2 25 PCT T	345	.492	11.29	300	11.720	8669	28	660	79	.077	2.2	51	6.1	18.9	378
3 55 PCT T	510	.415	12.12	745	12.592	12837	58	855	271	.197	8.5	126	39.8	39.5	221
4 25 PCT T	220	.518	11.36	200	11.903	8119	17	719	99	.077	1.3	55	3.7	17.2	399
5 10 PCT T	225	.115	9.32	915	9.459	5715	15	190	85	.057	.8	8	5.1	7.9	495
6 25 PCT T	275	.435	11.12	250	11.585	8482	22	693	45	.077	1.7	50	5.0	18.3	399
7 90 PCT T	90	.598	14.08	450	14.688	20502	19	1683	323	.113	1.6	191	36.5	64.5	63
8 25 PCT T	190	.415	11.29	255	11.671	8119	11	583	63	.077	.8	45	9.9	17.6	396
9 C.T.	300	.115	11.12	190	11.268	9991	13	92	20	.193	1.9	13	2.8	0.0	521

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	18.8	0.0	0	3.6	0	0	.056	0	600	21.6	10.3	5.3	.9	9.7	0.0
2 25 PCT T	15.1	29.2	45	19.9	.881	2.9	.059	.987	1970	18.6	11.2	8.5	9.7	8.9	7.9
3 55 PCT T	8.4	52.2	137	28.5	.596	9.7	.057	.932	2000	17.9	92.2	20.9	37.7	23.6	30.5
4 25 PCT T	15.6	23.6	63	17.9	.759	2.6	.059	.962	1980	18.8	6.7	7.8	9.8	7.8	7.2
5 10 PCT T	19.3	9.1	29	12.1	1.329	5.8	.060	.885	1980	16.8	2.0	.9	3.1	3.9	2.1
6 25 PCT T	15.6	23.9	63	17.8	.741	2.5	.059	.963	1960	18.8	6.9	6.8	9.7	7.7	7.2
7 90 PCT T	2.5	85.9	229	45.3	.527	3.8	.066	.321	2010	15.1	8.6	91.9	38.2	28.8	38.5
8 25 PCT T	15.8	23.9	63	17.9	.793	2.5	.059	.952	1960	18.6	3.1	6.6	9.6	7.5	7.2
9 C.T.	20.9	0.0	0	9.9	0	0	.056	0	2000	17.8	9.5	1.8	1.8	7.6	0.0
1 IDLE	20.5	0.0	0	3.5	0	0	.091	0	600	29.2	19.7	2.1	.5	9.5	0.0
2 25 PCT T	19.9	29.7	45	19.1	.779	3.2	.053	.971	2000	18.7	9.3	9.2	5.8	8.2	7.9
3 55 PCT T	8.7	53.0	138	28.3	.539	5.2	.057	.325	2020	17.5	36.3	22.9	38.1	23.3	30.5
4 25 PCT T	15.7	23.8	61	17.9	.777	2.1	.059	.972	1990	18.9	5.5	10.0	3.6	7.7	7.0
5 10 PCT T	19.5	10.0	24	12.6	1.263	9.1	.093	.768	1990	23.0	3.4	1.5	9.9	9.0	2.2
6 25 PCT T	15.5	29.6	45	18.7	.741	2.7	.053	.963	1990	18.9	7.3	9.0	9.8	8.1	9.9
7 90 PCT T	2.5	86.5	225	45.2	.523	3.8	.066	.318	2020	15.1	6.9	39.7	35.0	28.6	38.3
8 25 PCT T	15.6	23.6	63	17.9	.760	2.7	.053	.962	1970	18.8	3.5	8.2	9.7	7.7	7.1
9 C.T.	20.5	0.0	0	9.9	0	0	.051	0	2000	19.5	8.0	2.9	2.7	7.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 1.5 36 5.1

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 1.3 29 5.6

TWO CYCLE COMPOSITE -

HC- FID 0.35(1.5) + 0.65(1.3) = 1.325 G/KW HR (.988 85)

CO- NDIR 0.35(36.5) + 0.65(29.3) = 31.783 G/KW HR (23.701 85)

NOX-CL 0.35(5.1) + 0.65(5.6) = 5.406 G/KW HR (5.031 85)

HC + NOX = 6.731 G/KW HR (5.019 85)

SFC = .927 KG/KW HR (.702 85)

TABLE E-30. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-218 RUN-2 07-21-76 MODALLY OPT EFI-HEI MVA-EGR-PL MAIR-DECEL K= 1.069 HUM= 19.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HP	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	630	.590	9.53	29	10.138	1592	10	146	1	.232	2.9	38	.3	0.0	975
2 25 PCT T	495	.576	11.12	235	11.751	8890	92	890	63	.077	3.2	68	4.9	17.8	381
3 55 PCT T	680	.668	11.99	690	12.539	13109	79	989	256	.197	11.7	195	37.6	39.1	221
4 25 PCT T	300	.597	11.12	245	11.700	8879	23	762	60	.077	1.8	59	4.6	17.7	396
5 10 PCT T	260	.169	14.08	520	14.279	5352	11	129	69	.057	.6	7	3.9	7.1	995
6 25 PCT T	290	.476	11.12	240	11.628	8255	23	683	60	.077	1.8	53	4.7	17.7	901
7 90 PCT T	190	.856	13.44	620	14.514	20957	29	2936	310	.113	3.3	275	35.0	69.2	63
8 25 PCT T	165	.997	11.36	320	11.875	8437	13	713	81	.077	1.0	55	6.2	18.5	389
9 C.T.	180	.115	12.45	175	12.785	4536	7	82	22	.193	1.0	12	3.2	0.0	521
1 IDLE	360	.251	9.49	32	9.930	1588	4	81	2	.232	1.5	19	.9	0.0	980
2 25 PCT T	395	.455	11.29	360	11.739	8880	29	690	96	.077	2.2	53	7.9	17.9	381
3 55 PCT T	535	.511	11.99	760	12.541	12791	61	1051	275	.197	8.9	155	40.9	39.2	226
4 25 PCT T	235	.525	11.36	265	11.911	8396	18	793	66	.077	1.9	57	5.1	18.9	396
5 10 PCT T	290	.159	13.78	585	13.966	5529	11	128	83	.057	.6	7	4.7	7.2	995
6 25 PCT T	285	.990	11.29	385	11.741	8301	22	698	74	.077	1.7	54	5.9	17.8	389
7 90 PCT T	190	.809	14.08	660	14.904	20593	30	2295	329	.113	3.4	259	36.6	65.0	61
8 25 PCT T	155	.990	11.36	380	11.867	8210	12	685	74	.077	.9	53	5.7	18.3	389
9 C.T.	190	.115	12.45	180	12.786	4508	8	87	29	.193	1.1	12	3.9	0.0	516

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 IDLE	18.7	0.0	0	3.9	0	0	.067	0	600	21.5	9.1	5.9	.3	9.9	0.0
2 25 PCT T	15.0	23.9	63	19.6	.820	2.7	.059	.999	2000	18.7	12.0	9.5	4.8	8.9	7.2
3 55 PCT T	8.7	52.9	138	28.9	.551	4.9	.057	.335	2000	17.6	93.7	20.9	37.5	23.7	30.9
4 25 PCT T	15.6	23.7	63	17.8	.752	2.6	.053	.957	1980	18.7	6.4	8.2	4.6	7.6	7.2
5 10 PCT T	19.5	9.4	25	11.8	1.235	7.3	.049	.751	1980	15.6	2.9	1.0	3.9	3.7	2.1
6 25 PCT T	15.8	23.7	63	18.2	.767	2.6	.053	.967	1980	18.9	6.6	7.9	4.6	7.8	7.2
7 90 PCT T	2.5	86.1	225	95.1	.529	3.6	.046	.319	2010	15.3	12.2	38.7	34.9	28.9	38.9
8 25 PCT T	15.1	29.8	65	19.6	.751	3.3	.059	.957	2000	18.5	3.8	7.7	4.2	8.0	7.5
9 C.T.	20.5	0.0	0	10.0	0	0	.058	0	2000	17.3	3.8	1.6	3.1	8.0	0.0
1 IDLE	18.9	0.0	0	3.5	0	0	.056	0	600	22.0	6.7	2.8	.9	9.5	0.0
2 25 PCT T	15.0	29.0	63	19.9	.808	5.1	.053	.992	2000	18.7	10.1	8.0	6.7	8.3	7.2
3 55 PCT T	8.9	52.6	138	28.2	.536	5.3	.057	.326	2000	17.5	91.0	23.3	36.9	23.0	30.2
4 25 PCT T	15.6	29.6	65	18.9	.746	2.7	.058	.954	1990	18.9	6.5	8.6	4.6	7.9	7.9
5 10 PCT T	19.5	9.6	25	12.3	1.277	8.8	.063	.777	1990	15.9	2.8	1.1	4.3	3.9	2.1
6 25 PCT T	15.3	29.9	63	18.3	.764	3.3	.059	.966	1990	18.7	7.9	8.1	5.9	7.8	7.2
7 90 PCT T	2.9	87.1	225	95.9	.521	3.8	.047	.317	2030	19.9	15.5	38.2	33.9	28.5	38.5
8 25 PCT T	15.3	29.5	65	18.1	.738	3.1	.059	.999	1980	18.5	9.2	7.9	5.2	7.7	7.9
9 C.T.	20.3	0.0	0	10.6	0	0	.058	0	2000	17.3	5.2	1.9	3.1	8.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 1.9 38 5.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 1.2 35 5.8

TWO CYCLE COMPOSITE -

HC- FID 0.35(1.9) + 0.65(1.2) = 1.259 G/KW HR (.935 G/HP HR)

CO- NDIR 0.35(38.1) + 0.65(35.3) = 36.292 G/KW HR (27.063 G/HP HR)

NOX-CL 0.35(5.9) + 0.65(5.8) = 5.671 G/KW HR (4.229 G/HP HR)

HC + NOX = 6.929 G/KW HR (5.163 G/HP HR)

SFC = .929 KG/KW HR (.705 G/HP HR)

Table E-30 (Cont'd.)

Test 218 Run 1&2 MODAL TEST CONDITIONS

Mode	Air Inj.	EGR,* %	Air/** Fuel	Fuel** /Air
1 (idle)	ON	0.0	14.2	.070
2 (25%)	ON	15.4	14.1	.071
3 (55%)	ON	14.2	14.4	.069
4 (25%)	ON	15.4	14.0	.071
5 (10%)	OFF	0.0	16.1	.062
6 (25%)	ON	15.4	14.1	.071
7 (90%)	ON	6.8	13.6	.074
8 (25%)	ON	15.4	14.3	.070
9 (CT)	OFF	0.0	16.9	.059

Reference Conditions***

	ECO_2	ICO_2	EGR	EFI
1	----	----	0.0	250
2, 4, 6, & 8	13.21	1.86	1.0	250
3	13.78	1.78	2.5	200
5	----	----	0.0	350
7	12.12	0.79	2.5	150
9	----	----	0.0	300

ECO_2 & ICO_2 - Exhaust CO_2 and Intake CO_2 in %
Background CO_2 = 0.06%

$$* \text{EGR \%} = \frac{CO_2 \text{ Intake} - CO_2 \text{ background}}{CO_2 \text{ Exhaust}} * \frac{100 - CO_2 \text{ Intake}}{100 - CO_2 \text{ Exhaust}} * 100$$

** Using the equation in the recommended procedure - data obtained with air injection system cut off

*** These reference conditions are specific to the systems used and, with the exception of CO_2, only serve to document the settings for possible future use.

TABLE E-31. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-21A RUN-1+2 07-23-76 AIR/FUEL RATIO CHECK FOR TEST 21A RUN 1-2 K= 1.091 HUM= 12.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	2588	2.760	12.25	-0	15.316	0	0	0	0	0.0	0	0.0	0.0	0
2	2000	1585	2.020	13.35	-0	15.551	0	0	0	0	0.0	0	0.0	17.9	0
3	2000	1505	1.350	13.78	-0	15.302	0	0	0	0	0.0	0	0.0	39.2	0
4	2000	1600	2.380	13.07	-0	15.433	0	0	0	0	0.0	0	0.0	17.9	0
5	2000	140	.098	13.44	-0	13.256	0	0	0	0	0.0	0	0.0	2.2	0
6	2000	1600	2.250	13.07	-0	15.503	0	0	0	0	0.0	0	0.0	17.9	0
7	2000	1792	3.650	12.12	-0	15.926	0	0	0	0	0.0	0	0.0	63.9	0
8	2000	1505	2.190	13.07	-0	15.382	0	0	0	0	0.0	0	0.0	17.9	0
9	2000	1340	.125	12.79	-0	13.068	0	0	0	0	0.0	0	0.0	0.0	0

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CIO	FC	BSHC	BSCO	BSNOx	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1		-0.0	0.0	0	0.0	I	I	I	I	14.2	.070	I	I	I	I
2		-0.0	29.0	63	0.8	0.00	0.00	0.00	0.000	14.1	.071	0.00	0.00	0.00	0.000
3		-0.0	52.5	138	0.8	0.00	0.00	0.00	0.000	14.9	.069	0.00	0.00	0.00	0.000
4		-0.0	29.0	63	0.8	0.00	0.00	0.00	0.000	14.0	.071	0.00	0.00	0.00	0.000
5		-0.0	9.7	25	0.8	0.00	0.00	0.00	0.000	16.1	.062	0.00	0.00	0.00	0.000
6		-0.0	29.0	63	0.8	0.00	0.00	0.00	0.000	14.1	.071	0.00	0.00	0.00	0.000
7		-0.0	85.7	225	0.8	0.00	0.00	0.00	0.000	13.6	.074	0.00	0.00	0.00	0.000
8		-0.0	29.0	63	0.8	0.00	0.00	0.00	0.000	14.3	.070	0.00	0.00	0.00	0.000
9		-0.0	0.0	0	0.0	I	I	I	I	16.9	.059	I	I	I	I

ID =

TABLE E-32. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-233 RUN-01 08-20-74 EFI-TP-HEI NOAI-1978TDC-250ECU X OLD HOOKUP K= 1.097 HUM= 16.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1632	.945	13.07	60	14.199	1769	23	238	3	.232	5.3	55	.6	0.0	965
2 25 PCT T	90	.020	12.93	360	12.955	9935	3	30	95	.077	.3	2	7.9	17.9	358
3 55 PCT T	28	.025	13.93	1572	13.958	14016	3	51	575	.197	.5	8	89.5	90.0	231
4 25 PCT T	20	.010	13.07	510	13.082	9389	2	14	133	.077	.1	1	10.3	18.0	358
5 10 PCT T	18	.005	11.99	150	11.997	7121	1	6	32	.057	.1	0	1.8	7.1	919
6 25 PCT T	14	.010	13.07	950	13.082	9389	1	14	118	.077	.1	1	9.1	17.9	358
7 90 PCT T	1520	9.230	11.99	800	16.991	22362	300	11622	396	.113	33.9	1313	99.8	65.7	86
8 25 PCT T	28	.010	13.07	550	13.083	9117	2	14	190	.077	.2	1	10.7	17.8	358
9 C.T.	22900	.216	.39	9	2.858	999	393	76	1	.193	56.2	11	.1	0.0	617
1 IDLE	1760	.788	13.21	63	14.196	1729	24	193	3	.232	5.6	95	.6	0.0	965
2 25 PCT T	108	.020	13.07	900	13.107	9399	12	29	109	.077	.9	2	8.0	18.0	358
3 55 PCT T	88	.025	13.93	1690	13.965	13880	10	51	608	.197	1.5	7	89.9	39.7	239
4 25 PCT T	64	.010	13.07	500	13.087	9117	5	14	127	.077	.9	1	9.8	17.8	358
5 10 PCT T	60	.005	12.49	150	12.502	7076	4	6	31	.057	.2	0	1.8	7.2	919
6 25 PCT T	48	.010	13.07	510	13.085	9389	4	14	133	.077	.3	1	10.3	17.9	358
7 90 PCT T	1688	9.230	11.99	800	16.937	22453	297	11672	398	.113	33.5	1319	95.0	65.8	86
8 25 PCT T	52	.010	13.07	510	13.086	9389	4	14	133	.077	.3	1	10.2	17.8	358
9 C.T.	20480	.216	.39	10	2.665	999	386	82	1	.193	55.1	12	.1	0.0	617

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOx	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOx	FUEL	POWER
1 I		18.3	0.0	0	3.9	R	R	.069	R	600	15.5	5.5	9.0	.9	9.9	0.0
2 25		19.1	29.0	63	20.8	.867	9.0	.058	.527	2000	17.1	.3	.2	9.3	8.7	7.2
3 55		9.1	53.7	138	30.3	.576	10.9	.063	.350	2090	15.9	.5	.5	99.9	29.7	30.6
4 25		19.1	29.1	63	20.7	.859	5.6	.059	.522	2010	16.9	.1	.1	6.1	8.7	7.2
5 10		16.3	9.6	25	15.7	1.639	3.9	.059	.997	1980	18.9	.1	.0	1.1	9.9	2.1
6 25		19.1	29.0	63	20.7	.862	5.8	.059	.529	2000	16.9	.1	.1	5.9	8.7	7.2
7 90		3.9	88.1	226	99.3	.559	9.6	.076	.390	2050	13.1	35.1	99.3	26.5	30.3	38.6
8 25		19.1	23.9	61	20.1	.891	5.9	.059	.512	1990	16.9	.2	.1	6.3	8.9	7.1
9 CT		29.9	0.0	0	1.1	R	R	.013	R	2000	71.6	58.2	.8	.0	.9	0.0
1 I		18.3	0.0	0	3.8	R	R	.069	R	600	15.5	5.7	3.2	.9	9.8	0.0
2 25		19.1	29.2	63	20.6	.852	9.9	.059	.518	2010	16.9	.9	.2	9.6	8.7	7.2
3 55		9.2	53.2	138	30.6	.575	11.6	.063	.350	2020	15.9	1.5	.5	51.0	29.5	30.9
4 25		19.1	23.9	63	20.1	.990	5.9	.059	.511	1990	16.9	.9	.1	5.6	8.9	7.2
5 10		16.3	9.6	25	15.6	1.629	3.3	.057	.988	1980	17.7	.2	.0	1.0	9.9	2.1
6 25		19.1	29.1	63	20.7	.860	5.4	.059	.523	2000	16.9	.3	.1	5.9	8.7	7.2
7 90		3.9	88.3	226	99.5	.561	9.6	.076	.391	2050	13.1	39.3	99.0	25.7	30.5	38.7
8 25		19.1	23.9	63	20.6	.841	5.6	.059	.529	1990	16.9	.3	.1	5.8	8.7	7.2
9 CT		29.3	0.0	0	1.1	R	R	.013	R	2000	77.0	56.9	.8	.1	.9	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 5.1 79 8.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 5.2 79 9.3

TWO CYCLE COMPOSITE -	HC- FID	0.35(5.1) + 0.65(5.2) =	5.162	G/KW HR	(3.850 BS)
	CO- NDIR	0.35(73.6) + 0.65(73.7) =	73.651	G/KW HR	(54.922 BS)
	NOx-CL	0.35(8.9) + 0.65(9.3) =	9.167	G/KW HR	(6.836 BS)
		HC + NOX =	14.329	G/KW HR	(10.685 BS)
ID =		SFC =	.933	KG/KW HR	(.713 BS)

TABLE E-33. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-233 RUN-02 08-20-76 EFI-TR-HEI NOAI-_9BTDC-S7DECU X NEW HOOKUP K= 1.090 HUM= 16.2 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	2112	1.177	12.79	59	19.206	1678	28	281	3	.232	6.5	65	.6	0.0	965
2 25 PCT T	100	.030	12.79	900	12.831	9117	8	93	103	.077	.6	3	7.9	17.8	363
3 55 PCT T	89	.030	13.93	1960	13.970	13653	9	60	516	.197	1.9	9	75.9	39.2	239
4 25 PCT T	120	.015	13.07	500	13.098	9072	9	21	125	.077	.7	2	9.6	17.8	363
5 10 PCT T	199	.010	11.99	130	12.016	7167	10	12	28	.057	.5	1	1.6	7.1	919
6 25 PCT T	132	.015	12.79	980	12.820	9072	10	21	123	.077	.8	2	9.5	17.7	363
7 90 PCT T	2016	9.960	11.99	720	14.682	21500	299	11611	336	.113	33.8	1312	37.9	69.9	99
8 25 PCT T	120	.015	13.07	980	13.098	9117	9	21	121	.077	.7	2	9.3	17.8	363
9 C.T.	19200	.109	.23	8	2.260	343	309	39	0	.193	59.2	5	.1	0.0	617
1 IDLE	1696	.771	13.07	62	19.032	1678	23	186	3	.232	5.3	93	.6	0.0	965
2 25 PCT T	220	.030	12.79	930	12.895	9072	17	93	110	.077	1.3	3	8.5	17.6	363
3 55 PCT T	160	.030	13.93	1572	13.978	13562	18	59	552	.197	2.6	9	81.1	38.8	239
4 25 PCT T	129	.020	13.07	990	13.109	9026	10	28	122	.077	.7	2	9.9	17.5	363
5 10 PCT T	100	.010	11.99	130	12.011	7121	7	12	28	.057	.4	1	1.6	7.1	919
6 25 PCT T	88	.015	13.07	980	13.095	9117	7	21	121	.077	.5	2	9.3	17.8	363
7 90 PCT T	1920	9.570	11.73	700	16.521	21910	286	11963	328	.113	32.9	1352	37.1	69.5	99
8 25 PCT T	72	.020	13.07	580	13.098	9026	6	28	195	.077	.9	2	11.1	17.6	363
9 C.T.	19200	.216	.23	10	2.379	363	295	67	1	.193	92.1	10	.1	0.0	617

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I		18.3	0.0	0	3.7	R	R	.065	R	600	15.5	7.3	9.7	.9	9.8	0.0
2 2S		19.3	23.8	63	20.1	.893	9.9	.058	.513	1980	17.3	.7	.2	5.2	8.7	7.2
3 5S		9.2	52.6	139	30.1	.573	10.0	.063	.398	1990	15.9	1.5	.6	99.8	29.8	30.5
4 2S		19.3	23.9	63	20.0	.838	5.9	.059	.510	1980	16.9	.8	.1	6.3	8.6	7.2
5 10		16.3	9.5	26	15.8	1.668	3.0	.059	1.019	1950	18.9	.6	.0	1.0	5.1	2.1
6 2S		19.3	23.7	63	20.0	.893	5.3	.058	.513	1970	17.3	.9	.1	6.2	8.6	7.2
7 90		3.7	86.9	227	97.9	.599	9.0	.077	.339	2000	12.9	37.9	93.7	29.9	30.0	38.5
8 2S		19.3	23.9	63	20.1	.892	5.2	.059	.512	1980	16.9	.8	.1	6.1	8.7	7.2
9 CT		29.3	0.0	0	.8	R	R	.011	R	2000	90.9	99.5	.3	.0	.6	0.0
1 I		18.3	0.0	0	3.7	R	R	.069	R	600	15.7	6.2	3.0	.9	9.8	0.0
2 2S		19.3	23.6	63	20.0	.896	9.7	.058	.515	1960	17.2	1.6	.2	5.3	8.7	7.2
3 5S		9.2	52.1	139	29.9	.579	10.8	.063	.399	1970	15.9	3.0	.6	51.1	29.8	30.3
4 2S		19.3	23.5	63	19.9	.847	5.3	.059	.515	1950	16.9	.9	.2	5.9	8.6	7.2
5 10		16.3	9.5	26	15.7	1.656	3.0	.059	1.007	1950	18.9	.9	.0	1.0	5.0	2.1
6 2S		19.3	23.9	63	20.1	.892	5.2	.059	.512	1980	16.9	.6	.1	5.9	8.7	7.3
7 90		3.7	86.9	227	97.2	.596	3.9	.077	.332	2000	13.0	37.7	95.0	23.9	30.1	38.7
8 2S		19.3	23.5	63	19.9	.895	6.3	.059	.519	1950	16.9	.5	.2	7.0	8.6	7.2
9 CT		29.3	0.0	0	.8	R	R	.012	R	2000	86.5	99.1	.7	.0	.6	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------						9.8	76	8.2		
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------						9.7	77	8.6		
TWO CYCLE COMPOSITE -	HC- FID	0.35(	9.8) + 0.65(	9.7) =	9.715	G/KW	HR	(3.516 BS)		
	CO- NDIR	0.35(	75.5) + 0.65(	77.2) =	76.652	G/KW	HR	(57.140 BS)		
	NOx-CL	0.35(	8.2) + 0.65(	8.6) =	8.481	G/KW	HR	(6.329 BS)		
				HC + NOX =	13.196	G/KW	HR	(9.840 BS)		
				SFC =	.928	KG/KW	HR	(.703 BS)		

ID =

TABLE E-34. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-233 RUN-03 08-23-76 EFI-TR-HEI NOAI-198IDC-S70ECU X NEW HOOKUP K= 1.091 HUM= 16.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	1360	1.198	12.52	57	13.872	1769	20	309	3	.232	9.6	72	.6	0.0	965
2 25 PCT T	50	.030	12.79	910	12.826	9662	9	96	112	.077	.3	9	8.6	17.9	356
3 55 PCT T	33	.020	13.93	1392	13.959	19107	9	91	510	.197	.6	6	79.9	39.2	226
4 25 PCT T	30	.010	12.79	950	12.803	9389	2	15	120	.077	.2	1	9.2	17.7	356
5 10 PCT T	25	.010	11.99	190	12.003	7530	2	13	32	.057	.1	1	1.8	7.1	911
6 25 PCT T	24	.005	12.93	960	12.938	9525	2	7	123	.077	.2	1	9.9	17.9	356
7 90 PCT T	1792	3.910	11.99	730	16.104	21682	277	10633	356	.113	31.3	1202	90.2	65.1	86
8 25 PCT T	32	.010	13.07	970	13.084	9980	3	15	123	.077	.2	1	9.5	17.9	356
9 C.T.	16000	.159	.23	7	1.996	363	292	58	0	.193	91.8	8	.1	0.0	620
1 IDLE	1929	.963	12.79	62	13.913	1729	20	241	3	.232	9.6	56	.6	0.0	962
2 25 PCT T	120	.020	13.07	500	13.109	9707	10	30	139	.077	.8	2	10.3	17.9	353
3 55 PCT T	80	.015	13.93	1960	13.959	13971	9	31	530	.197	1.7	9	77.8	39.3	226
4 25 PCT T	69	.005	13.07	500	13.082	9835	5	7	131	.077	.9	1	10.1	17.8	356
5 10 PCT T	56	.005	12.25	160	12.261	7893	9	7	37	.057	.2	0	2.1	7.2	909
6 25 PCT T	95	.010	13.07	990	13.085	9893	9	15	139	.077	.3	1	10.3	18.1	356
7 90 PCT T	1608	9.390	11.61	650	16.157	22271	286	12089	325	.113	32.3	1366	36.7	66.0	86
8 25 PCT T	50	.010	13.21	530	13.226	9980	9	19	138	.077	.3	1	10.6	17.9	356
9 C.T.	12600	.125	.47	6	1.882	363	298	99	1	.193	35.5	7	.1	0.0	620

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- NV	CHP	CTQ	FC	ASFC	BSNOx	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOx	FUEL	POWER
1 I		18.3	0.0	0	3.4	R	R	.063	R	600	15.8	5.7	5.5	.9	9.9	0.0
2 2S		19.0	29.0	63	21.3	.887	9.7	.058	.539	2000	17.3	.9	.3	5.6	8.9	7.2
3 5S		8.9	52.4	137	31.1	.592	9.9	.063	.360	2010	15.9	.7	.5	98.5	29.8	30.3
4 2S		19.0	23.7	63	20.7	.872	5.1	.058	.530	1980	17.3	.2	.1	6.0	8.7	7.2
5 10		16.2	9.5	25	14.6	1.750	3.9	.059	1.069	1960	18.9	.1	.1	1.2	5.1	2.1
6 2S		19.0	29.0	63	21.0	.879	5.2	.058	.532	2000	17.1	.2	.0	6.1	8.8	7.2
7 9O		3.9	87.9	225	47.8	.597	9.1	.075	.333	2390	13.9	39.5	92.8	26.1	29.9	38.7
8 2S		19.0	29.0	63	20.9	.870	5.2	.059	.529	2000	16.9	.3	.1	6.2	8.7	7.2
9 CT		29.9	0.0	0	.8	R	R	.010	R	2000	103.3	52.8	.6	.0	.6	0.0
1 I		16.2	0.0	0	3.8	R	R	.063	R	600	15.8	6.1	3.9	.9	9.7	0.0
2 2S		13.9	29.1	63	21.4	.889	5.7	.059	.541	2000	16.9	1.0	.2	6.5	8.9	7.2
3 5S		8.9	52.7	138	30.8	.585	10.2	.063	.356	2010	15.9	1.8	.3	99.1	29.9	30.1
4 2S		19.0	23.8	63	20.8	.872	5.6	.059	.530	1980	16.9	.5	.0	6.3	8.6	7.1
5 10		16.1	9.7	24	17.9	1.791	3.9	.055	1.090	2000	18.0	.3	.0	1.3	5.3	2.2
6 2S		19.0	29.2	63	21.7	.896	5.6	.059	.545	2010	16.9	.9	.1	6.5	9.0	7.3
7 9O		3.9	88.9	225	99.1	.555	3.7	.075	.338	2060	13.3	92.7	99.9	23.1	29.8	38.9
8 2S		19.0	29.0	63	20.9	.871	5.9	.060	.530	1990	16.8	.9	.1	6.7	8.7	7.2
9 CT		29.9	0.0	0	.8	R	R	.009	R	2000	109.9	96.8	.5	.1	.6	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------			9.2	69	8.3
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------			9.0	77	8.9
TWO CYCLE COMPOSITE -	HC- FID 0.35(9.2) + 0.65(9.0) =	9.102	G/KW HR	(3.059 GS)	
	CO- NDIR 0.35(69.2) + 0.65(76.6) =	73.008	G/KW HR	(55.188 GS)	
	NOX-CL 0.35(8.3) + 0.65(8.9) =	8.380	G/KW HR	(6.299 GS)	
	HC + NOx =	12.481	G/KW HR	(9.307 GS)	
ID =	SFC =	.940	KG/KW HR	(.723 GS)	

TABLE E-35. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
ENGINE-2 TEST-233 RUN-09 08-23-76 EFI-TR-HFI #AIXCT-198-570ECU X NEW HOOKUP K= 1.081 HUM= 15.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	988	.969	9.22	37	9.792	1769	18	172	2	.232	2.2	90	.6	0.0	965
2 25 PCT T	30	.041	10.30	330	10.345	9616	3	115	110	.077	.2	9	8.5	17.8	356
3 55 PCT T	16	.090	11.61	1230	11.652	13471	2	98	529	.197	.3	19	77.8	39.3	226
4 25 PCT T	13	.030	10.30	350	10.332	9571	1	57	114	.077	.1	4	9.0	17.9	356
5 10 PCT T	15	.035	9.93	130	9.967	7666	1	58	38	.057	.1	3	2.2	7.1	909
6 25 PCT T	11	.035	10.53	900	10.567	9798	1	66	133	.077	.1	5	10.3	17.9	353
7 90 PCT T	100	1.038	14.59	500	15.590	22861	17	3075	263	.113	1.9	347	29.7	65.3	86
8 25 PCT T	10	.020	10.53	900	10.551	9780	1	36	129	.077	.1	3	9.9	17.8	353
9 C.T.	29000	.216	.55	5	3.183	363	276	50	0	.193	39.9	7	.0	0.0	620
1 IDLE	709	.376	9.93	92	9.882	1729	13	132	3	.232	3.1	31	.6	0.0	965
2 25 PCT T	194	.061	10.30	340	10.377	9707	15	116	119	.077	1.1	9	8.8	17.9	353
3 55 PCT T	109	.090	11.73	1300	11.782	14288	19	99	566	.197	2.1	15	83.2	39.6	229
4 25 PCT T	68	.030	10.53	380	10.568	9707	7	56	125	.077	.5	4	9.6	17.9	353
5 10 PCT T	60	.035	9.93	120	9.972	7756	5	59	35	.057	.3	3	2.0	7.1	909
6 25 PCT T	51	.030	10.30	370	10.336	9798	5	58	126	.077	.4	4	9.7	18.0	356
7 90 PCT T	70	.983	14.86	640	15.351	22698	12	1930	337	.113	1.3	162	38.1	65.7	86
8 25 PCT T	90	.020	10.53	900	10.559	9389	4	36	128	.077	.3	3	9.8	17.9	356
9 C.T.	16000	.216	.31	5	2.133	363	273	79	0	.193	39.1	11	.0	0.0	620

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	ASFC	ASNOx	F/A	SFC KG/Kw HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOx	FUEL	POWER
1 I		18.3	0.0	0	3.9	R	R	.095	R	600	22.3	5.0	9.2	.9	9.8	0.0
2 25		19.0	23.9	63	21.2	.887	9.7	.097	.590	2000	21.1	.5	2.0	5.7	8.7	7.2
3 55		8.9	52.6	137	30.8	.585	10.2	.053	.356	2020	18.9	.7	3.3	52.6	29.2	30.3
4 25		19.0	23.9	63	21.1	.881	9.9	.097	.536	2000	21.2	.2	1.0	6.1	8.7	7.2
5 10		16.1	9.6	25	16.9	1.768	9.0	.093	1.076	1980	23.1	.2	.8	1.5	5.1	2.1
6 25		13.9	29.0	63	21.6	.901	9.6	.098	.598	2000	20.8	.2	1.2	6.9	8.9	7.2
7 90		3.9	87.5	229	50.9	.576	3.1	.070	.350	2050	19.2	9.3	80.2	20.1	30.9	38.7
8 25		13.9	23.8	63	20.9	.877	9.5	.098	.533	1990	20.8	.2	.6	6.7	8.6	7.2
9 CT		29.9	0.0	0	.8	R	R	.016	R	2000	69.3	88.7	1.6	.0	.6	0.0
1 I		18.3	0.0	0	3.8	R	R	.095	R	600	22.0	6.9	12.7	.9	9.7	0.0
2 25		13.9	29.0	63	21.9	.892	9.8	.097	.593	2000	21.1	2.9	9.7	5.9	8.8	7.2
3 55		8.8	53.1	138	31.5	.593	10.8	.053	.341	2020	18.7	9.3	6.0	51.9	29.7	30.9
4 25		13.9	29.0	63	21.9	.892	9.3	.098	.593	2000	20.7	1.1	1.9	6.0	8.8	7.2
5 10		16.1	9.6	25	17.1	1.784	9.7	.093	1.085	1980	23.0	.6	1.9	1.2	5.2	2.1
6 25		13.9	29.1	63	21.6	.895	9.3	.097	.595	2010	21.2	.8	1.9	6.0	8.9	7.2
7 90		3.9	86.1	225	49.6	.563	3.9	.069	.392	2060	19.5	2.7	67.0	23.5	29.9	38.7
8 25		13.9	29.0	63	20.7	.862	9.9	.098	.529	2000	20.8	.6	1.2	6.1	8.5	7.2
9 CT		29.9	0.0	0	.8	R	R	.010	R	2000	96.5	81.0	9.9	.0	.6	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1 ---------- 2.9 23 7.9
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 2.6 13 8.6

TWO CYCLE COMPOSITE -

HC- FID	0.35(	2.9) + 0.65(	2.6) =	2.691	G/KW HR	(1.858 BS)
CO- NDIR	0.35(	23.1) + 0.65(	12.8) =	16.389	G/KW HR	(12.221 BS)
NOx-CL	0.35(	7.9) + 0.65(	8.6) =	8.335	G/KW HR	(6.215 BS)
			HC + NOX =	10.826	G/KW HR	(8.073 BS)
			SFC =	.995	KG/KW HR	(.731 BS)

ID =

TABLE E-36. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-233 RUN-NOT 08-20-76 EFI-TR-HEI 198IDC-250ECUM1 0H-570ECUM2-9NH K= 1.097 HUM= 16.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	1280	5.310	11.98	155	16.938	27397	239	17350	83	239.2	17350	91.3	72.3	18
2	2000	1189	9.690	11.86	190	16.687	26762	219	15199	101	219.0	15199	110.9	74.3	8
3	2000	1120	9.570	11.98	170	16.179	27306	217	15581	95	217.1	15581	104.5	73.1	8
4	2000	672	9.690	11.99	170	16.758	27397	127	15489	92	126.8	15489	101.2	73.6	8

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOx	SFC KG/Kw HR
1	NO	.7	96.9	259	60.9	2.51	182.29	.87	.623	12.6	.079	3.37	244.39	1.17	.379
2	NO	.3	99.7	262	59.0	2.25	155.96	1.09	.592	12.9	.078	3.01	209.01	1.39	.360
3	NO	.3	98.0	257	60.2	2.26	162.36	.99	.619	13.3	.075	3.03	217.73	1.33	.379
4	YES	.3	98.7	259	60.9	1.31	160.13	.95	.612	12.8	.078	1.76	214.74	1.28	.372

ID = AIR INJ.

TABLE E-37. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-239 RUN-01 08-23-76 EFI-TH-HEI NOAI-19BTDC K= 1.099 HUM= 17.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	300	.263	12.79	56	13.087	1769	5	72	3	.232	1.1	17	.6	0.0	955
2 25 PCT T	8	.015	13.07	500	13.086	9253	1	22	129	.077	.0	2	9.9	17.5	358
3 55 PCT T	7	.020	14.23	1527	14.251	13381	1	38	523	.197	.1	6	76.9	38.7	299
4 25 PCT T	3	.005	13.35	540	13.355	8981	0	7	133	.077	.0	1	10.2	17.7	368
5 10 PCT T	2	.005	12.79	230	12.795	7303	0	6	58	.057	.0	0	2.7	7.1	929
6 25 PCT T	2	.010	13.35	520	13.360	9163	0	14	130	.077	.0	1	10.0	17.7	368
7 90 PCT T	680	.7[illegible]	14.23	2047	15.078	19232	99	1986	953	.113	11.2	224	107.7	69.1	81
8 25 PCT T	7	.0[illegible]	13.35	560	13.356	8981	1	7	137	.077	.0	1	10.6	17.8	368
9 C.T.	6080	.030	.15	9	.789	0	0	0	0	.193	0.0	0	0.0	0.0	615
1 IDLE	832	.209	12.79	60	13.087	1860	13	59	3	.232	3.1	19	.7	0.0	950
2 25 PCT T	74	.025	13.35	550	13.389	9389	6	36	141	.077	.9	3	10.8	18.0	361
3 55 PCT T	50	.020	14.23	1615	14.256	13698	5	39	566	.197	.8	6	83.2	39.6	239
4 25 PCT T	37	.010	13.35	680	13.369	9399	3	19	173	.077	.2	1	13.9	17.9	366
5 10 PCT T	29	.005	12.79	230	12.798	7121	2	6	97	.057	.1	0	2.7	7.2	929
6 25 PCT T	21	.005	13.35	570	13.357	9525	2	7	148	.077	.1	1	11.9	18.2	366
7 90 PCT T	960	1.137	13.93	2008	15.176	20003	199	3026	966	.113	16.3	392	109.1	66.1	76
8 25 PCT T	19	.005	13.99	550	13.997	9389	1	7	140	.077	.1	1	10.8	17.9	368
9 C.T.	5760	.051	.23	5	.858	0	0	0	0	.193	0.0	0	0.0	0.0	615

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 I	970	17.9	0.0	0	3.9	R	R	.059	R	600	16.9	8.5	6.6	.3	5.3	0.0
2 25	625	19.1	23.9	63	20.9	.870	5.6	.059	.529	1950	16.9	.9	.7	9.3	9.2	7.2
3 55	625	9.6	51.9	138	29.5	.569	10.3	.069	.396	1980	15.6	.9	2.2	33.6	25.3	30.3
4 25	625	19.5	23.7	63	19.8	.835	5.7	.060	.508	1970	16.6	.1	.2	9.5	8.9	7.2
5 10	800	16.9	9.5	25	16.1	1.701	5.2	.058	1.035	1950	17.3	.1	.1	1.2	5.9	2.1
6 25	625	19.5	23.7	63	20.2	.851	5.6	.060	.518	1970	16.6	.1	.9	9.9	9.1	7.3
7 90	390	3.2	86.0	226	92.9	.993	11.3	.068	.300	2000	19.7	89.6	89.5	47.1	28.0	38.6
8 25	625	19.5	23.9	63	19.8	.829	5.9	.060	.504	1980	16.6	.3	.2	9.6	8.9	7.3
9 CT	OFF	29.2	0.0	0	0.0	I	I	.009	I	2000	263.7	0.0	0.0	0.0	0.0	0.0
1 I	970	17.7	0.0	0	9.1	R	R	.059	R	600	16.9	19.5	3.7	.3	5.9	0.0
2 25	625	19.2	29.1	63	20.7	.859	6.0	.060	.523	2000	16.6	2.1	.8	9.5	9.0	7.2
3 55	625	9.9	53.1	138	30.2	.568	10.9	.069	.396	2030	15.6	3.8	1.6	39.9	25.1	30.3
4 25	625	19.9	29.1	63	20.6	.856	7.3	.060	.521	2000	16.6	1.1	.3	5.5	9.0	7.2
5 10	800	16.9	9.6	25	15.7	1.639	5.0	.056	.999	1980	17.3	.5	.1	1.1	5.1	2.1
6 25	625	19.9	29.9	63	21.0	.862	6.2	.060	.525	2020	16.6	.6	.2	9.7	9.2	7.3
7 90	390	3.0	88.6	226	99.1	.998	11.1	.069	.303	2060	19.6	76.9	93.3	95.1	28.2	38.8
8 25	625	19.5	29.0	63	20.7	.862	5.9	.061	.529	1990	16.5	.5	.1	9.9	9.0	7.2
9 CT	OFF	29.2	0.0	0	0.0	I	I	.009	I	2000	292.6	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .7 19 12.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 1.1 19 12.8

TWO CYCLE COMPOSITE -

HC- FID	0.35(.7) + 0.65(1.1) =	.967	G/KW HR	(.721 BS)
CO- NDIR	0.35(13.6) + 0.65(19.9) =	17.908	G/KW HR	(12.981 BS)
NOX-CL	0.35(12.9) + 0.65(12.8) =	12.697	G/KW HR	(9.468 BS)
	HC + NOX =	13.664	G/KW HR	(10.189 BS)
	SFC =	.915	KG/KW HR	(.683 BS)

ID = ECU SET

TABLE E-38. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-239 RUN-02 08-23-76 EFI-IR-HEI WAIXCT-19810C K= 1.097 HUM= 16.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	900	.125	8.81	93	9.929	1678	8	92	3	.232	1.9	11	.7	0.0	960
2 25 PCT T	19	.051	10.30	900	10.352	9571	1	95	135	.077	.1	7	10.9	18.0	366
3 55 PCT T	9	.030	11.73	1369	11.761	13880	1	72	588	.197	.1	11	86.5	39.5	299
4 25 PCT T	5	.030	10.07	930	10.101	9163	0	56	192	.077	.0	4	10.9	17.8	368
5 10 PCT T	3	.035	9.93	170	9.966	7257	0	55	97	.057	.0	3	2.7	7.1	932
6 25 PCT T	9	.035	10.30	930	10.336	9399	0	65	192	.077	.0	5	10.9	17.9	366
7 90 PCT T	1	.030	12.79	1969	12.820	18693	0	89	1092	.113	.0	10	117.8	69.9	86
8 25 PCT T	1	.025	10.30	960	10.325	9253	0	96	150	.077	.0	4	11.6	17.7	368
9 C.T.	6900	.090	.23	4	.912	0	0	0	0	.193	0.0	0	0.0	0.0	615
1 IDLE	900	.193	8.81	99	9.096	1633	8	70	3	.232	1.8	16	.7	0.0	955
2 25 PCT T	19	.030	10.30	970	10.332	9580	1	56	157	.077	.1	9	12.1	18.0	366
3 55 PCT T	9	.090	11.73	1392	11.771	13971	1	97	601	.197	.1	19	88.9	39.5	291
4 25 PCT T	5	.010	10.30	980	10.311	9117	0	18	155	.077	.0	1	11.9	18.0	366
5 10 PCT T	3	.010	9.93	180	9.940	7259	0	16	50	.057	.0	1	2.9	7.2	932
6 25 PCT T	9	.010	10.30	990	10.310	9935	0	18	163	.077	.0	1	12.6	18.0	366
7 90 PCT T	1	.020	13.07	1999	13.090	19684	0	61	1067	.113	.0	7	120.4	65.8	84
8 25 PCT T	1	.020	10.53	510	10.550	9163	0	35	161	.077	.0	3	12.9	17.9	368
9 C.T.	6900	.051	.23	91	.923	0	0	0	0	.193	0.0	0	0.0	0.0	615

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOx	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 I	970	18.1	0.0	0	3.7	R	R	.091	R	600	29.2	86.9	20.0	.3	5.0	0.0
2 25	625	19.9	29.1	63	21.1	.876	9.7	.047	.533	2000	21.2	5.0	13.3	9.1	9.9	7.3
3 55	625	9.6	52.9	138	30.6	.578	11.3	.053	.352	2020	18.7	3.5	19.9	39.9	26.1	30.6
4 25	625	19.5	23.8	63	20.2	.858	6.1	.096	.516	1980	21.7	1.8	7.8	9.3	9.0	7.2
5 10	900	17.0	9.5	24	16.0	1.679	5.1	.093	1.021	1960	23.1	.7	5.7	1.1	5.3	2.1
6 25	625	19.9	29.0	63	20.6	.859	6.0	.047	.522	1990	21.2	1.9	9.1	9.3	9.2	7.3
7 90	390	3.9	86.9	224	91.1	.976	12.3	.058	.289	2010	17.3	.8	18.3	96.9	26.9	38.3
8 25	625	19.5	23.8	63	20.9	.858	6.5	.047	.522	1970	21.2	.3	6.9	9.6	9.1	7.2
9 CT	OFF	29.2	0.0	0	0.0	I	I	.009	I	2000	228.2	0.0	0.0	0.0	0.0	0.0
1 I	970	17.9	0.0	0	3.6	R	R	.092	R	600	29.0	86.0	33.8	.3	9.8	0.0
2 25	625	19.9	29.1	63	20.9	.866	6.6	.047	.527	2000	21.2	5.1	9.0	9.6	9.2	7.2
3 55	625	9.5	53.0	139	30.8	.581	11.6	.053	.353	2020	18.7	3.7	29.6	33.8	25.9	30.3
4 25	625	19.9	29.1	63	20.1	.839	6.5	.047	.507	2000	21.2	1.8	2.9	9.5	8.8	7.2
5 10	800	17.0	9.7	24	16.0	1.652	5.3	.093	1.005	1990	23.1	.7	1.8	1.1	5.2	2.1
6 25	625	19.9	29.1	63	20.9	.862	6.9	.047	.529	2000	21.2	1.5	3.0	9.8	9.2	7.2
7 90	390	3.3	88.2	226	93.9	.992	12.9	.059	.299	2050	16.9	.9	19.3	96.1	28.0	38.7
8 25	625	19.5	24.0	63	20.2	.841	6.9	.048	.512	1990	20.8	.3	5.6	9.7	8.9	7.2
9 CT	OFF	29.2	0.0	0	0.0	I	I	.009	I	2000	225.6	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .1 3 13.5

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .1 3 13.9

TWO CYCLE COMPOSITE -

HC- FID	0.35(.1) + 0.65(.1) =	.119	G/KW HR	(.085 BS)
CO- NDIR	0.35(3.0) + 0.65(2.6) =	2.701	G/KW HR	(2.019 BS)
NOX-CL	0.35(13.5) + 0.65(13.9) =	13.786	G/KW HR	(10.280 BS)
	HC + NOX =	13.900	G/KW HR	(10.365 BS)
	SFC =	.913	KG/KW HR	(.679 BS)

ID = ECU SET

TABLE E-39. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-235 RUN-01A 08-23-76 EFI CYL TO CYL A/F CHECK - ECU970 K= 1.097 HUM= 16.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	192	.130	12.79	900	12.991	0	0	0	0	0.0	0	0.0	18.0	330
2	2000	176	.120	13.07	390	13.210	0	0	0	0	0.0	0	0.0	18.0	330
3	2000	96	.100	12.79	280	12.901	0	0	0	0	0.0	0	0.0	18.0	330
4	2000	190	.100	12.93	350	13.096	0	0	0	0	0.0	0	0.0	18.0	330
5	2000	100	.100	12.79	310	12.901	0	0	0	0	0.0	0	0.0	18.0	330
6	2000	180	.130	12.65	300	12.900	0	0	0	0	0.0	0	0.0	18.0	330
7	2000	109	.090	12.52	260	12.622	0	0	0	0	0.0	0	0.0	18.0	330
8	2000	232	.130	12.65	360	12.806	0	0	0	0	0.0	0	0.0	18.0	330

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CMP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	1	13.0	29.1	63	0.0	0.00	0.00	0.00	0.000	17.1	.058	0.00	0.00	0.00	0.000
2	2	13.0	29.1	63	0.0	0.00	0.00	0.00	0.000	16.8	.060	0.00	0.00	0.00	0.000
3	3	13.0	29.1	63	0.0	0.00	0.00	0.00	0.000	17.2	.058	0.00	0.00	0.00	0.000
4	4	13.0	29.1	63	0.0	0.00	0.00	0.00	0.000	17.0	.059	0.00	0.00	0.00	0.000
5	5	13.0	29.1	63	0.0	0.00	0.00	0.00	0.000	17.2	.058	0.00	0.00	0.00	0.000
6	6	13.0	29.1	63	0.0	0.00	0.00	0.00	0.000	17.3	.058	0.00	0.00	0.00	0.000
7	7	13.0	29.1	63	0.0	0.00	0.00	0.00	0.000	17.5	.057	0.00	0.00	0.00	0.000
8	8	13.0	29.1	63	0.0	0.00	0.00	0.00	0.000	17.3	.058	0.00	0.00	0.00	0.000

ID = CYLINDER

TABLE E-40. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-235 RUN-01B 08-23-76 EFI CYL TO CYL A/F CHECK - ECU625 K= 1.097 HUM= 16.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	309	.130	13.35	620	13.519	0	0	0	0	0.0	0	0.0	18.0	340
2	2000	352	.150	13.78	590	13.970	0	0	0	0	0.0	0	0.0	18.0	340
3	2000	168	.100	13.35	990	13.969	0	0	0	0	0.0	0	0.0	18.0	340
4	2000	269	.130	13.78	600	13.990	0	0	0	0	0.0	0	0.0	18.0	340
5	2000	192	.090	13.99	600	13.402	0	0	0	0	0.0	0	0.0	18.0	340
6	2000	900	.130	13.99	620	13.465	0	0	0	0	0.0	0	0.0	18.0	340
7	2000	176	.080	13.21	530	13.310	0	0	0	0	0.0	0	0.0	18.0	340
8	2000	560	.130	13.99	660	13.683	0	0	0	0	0.0	0	0.0	18.0	340

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CMP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	1	13.9	29.1	63	0.0	0.00	0.00	0.00	0.000	16.9	.061	0.00	0.00	0.00	0.000
2	2	13.9	29.1	63	0.0	0.00	0.00	0.00	0.000	15.9	.063	0.00	0.00	0.00	0.000
3	3	13.9	29.1	63	0.0	0.00	0.00	0.00	0.000	16.5	.061	0.00	0.00	0.00	0.000
4	4	13.9	29.1	63	0.0	0.00	0.00	0.00	0.000	15.9	.063	0.00	0.00	0.00	0.000
5	5	13.9	29.1	63	0.0	0.00	0.00	0.00	0.000	16.3	.061	0.00	0.00	0.00	0.000
6	6	13.9	29.1	63	0.0	0.00	0.00	0.00	0.000	16.2	.062	0.00	0.00	0.00	0.000
7	7	13.9	29.1	63	0.0	0.00	0.00	0.00	0.000	16.7	.060	0.00	0.00	0.00	0.000
8	8	13.9	29.1	63	0.0	0.00	0.00	0.00	0.000	16.2	.062	0.00	0.00	0.00	0.000

ID = CYLINDER

TABLE E-41. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-235 RUN-02 08-23-76 EFI A/F CHECK-ECU625 - LEAN INJ. IN CYL2+9 K= 1.097 HUM= 16.9 G/KG

MODE	PPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	260	.190	13.78	750	13.999	0	0	0	0	0.0	0	0.0	18.0	393
2	2000	212	.160	13.93	600	14.119	0	0	0	0	0.0	0	0.0	18.0	393
3	2000	120	.100	13.69	960	13.759	0	0	0	0	0.0	0	0.0	18.0	393
4	2000	290	.190	13.78	710	13.997	0	0	0	0	0.0	0	0.0	18.0	393
5	2000	156	.100	13.99	570	13.608	0	0	0	0	0.0	0	0.0	18.0	393
6	2000	292	.190	13.99	600	13.663	0	0	0	0	0.0	0	0.0	18.0	393
7	2000	112	.080	13.35	500	13.993	0	0	0	0	0.0	0	0.0	18.0	393
8	2000	390	.120	13.99	800	13.698	0	0	0	0	0.0	0	0.0	18.0	393

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	CALC F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	1	13.5	29.1	63	0.0	0.00	0.00	0.00	0.000	15.9	.063	0.00	0.00	0.00	0.000
2	2	13.5	29.1	63	0.0	0.00	0.00	0.00	0.000	15.8	.063	0.00	0.00	0.00	0.000
3	3	13.5	29.1	63	0.0	0.00	0.00	0.00	0.000	16.2	.062	0.00	0.00	0.00	0.000
4	4	13.5	29.1	63	0.0	0.00	0.00	0.00	0.000	15.9	.063	0.00	0.00	0.00	0.000
5	5	13.5	29.1	63	0.0	0.00	0.00	0.00	0.000	16.3	.061	0.00	0.00	0.00	0.000
6	6	13.5	29.1	63	0.0	0.00	0.00	0.00	0.000	16.2	.062	0.00	0.00	0.00	0.000
7	7	13.5	29.1	63	0.0	0.00	0.00	0.00	0.000	16.5	.061	0.00	0.00	0.00	0.000
8	8	13.5	29.1	63	0.0	0.00	0.00	0.00	0.000	16.3	.061	0.00	0.00	0.00	0.000

ID = CYLINDER

TABLE E-42. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
ENGINE-2 TEST-237 RUN-01R 09-02-76 EFI-TR-HEI MAIXCT-.53,92 BPEGRXM1+9-19NOVA K= 1.097 HUM= 16.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	900	.590	9.32	91	9.903	1769	8	195	3	.232	1.8	45	.6	0.0	962
2 25 PCT T	69	.051	10.19	300	10.298	9939	7	100	106	.077	.5	8	8.2	17.8	395
3 55 PCT T	98	.030	12.12	705	12.156	19651	6	79	310	.197	.9	11	45.5	29.5	206
4 25 PCT T	52	.030	10.30	330	10.336	9616	5	57	112	.077	.4	4	8.6	17.9	395
5 10 PCT T	76	.090	9.32	105	9.369	7620	7	67	31	.057	.4	4	1.8	6.8	399
6 25 PCT T	70	.035	10.30	320	10.343	9616	7	66	108	.077	.5	5	8.3	17.8	395
7 90 PCT T	509	3.210	12.65	200	15.918	24902	90	10199	119	.113	10.2	1146	12.9	65.3	56
8 25 PCT T	52	.020	10.69	270	10.666	9980	5	36	87	.077	.4	3	6.7	17.7	395
9 C.T.	7050	.061	.23	5	.997	0	0	0	0	.193	0.0	0	0.0	0.0	599
1 IDLE	990	.590	9.69	33	10.228	1769	8	188	2	.232	1.9	44	.5	0.0	962
2 25 PCT T	200	.082	10.30	320	10.409	9888	21	158	111	.077	1.6	12	8.5	17.9	395
3 55 PCT T	116	.030	12.25	770	12.293	19515	15	72	331	.197	2.2	11	98.7	39.9	206
4 25 PCT T	88	.035	10.69	290	10.685	9935	9	63	93	.077	.7	5	7.2	17.8	395
5 10 PCT T	80	.090	9.32	108	9.369	7530	7	66	32	.057	.4	4	1.8	7.1	399
6 25 PCT T	69	.035	10.91	350	10.952	9616	6	66	117	.077	.5	5	9.0	17.9	395
7 90 PCT T	996	3.360	12.65	200	16.067	25356	90	10711	115	.113	10.2	1210	13.0	66.0	56
8 25 PCT T	50	.025	10.76	270	10.791	9980	5	95	86	.077	.4	3	6.7	17.8	395
9 C.T.	6800	.109	.23	6	1.016	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	570	18.2	0.0	0	3.9	R	R	.096	R	600	22.0	11.9	3.7	.7	9.7	0.0
2 25	570	13.6	23.9	63	21.9	.916	9.5	.097	.557	2000	21.9	3.9	.6	8.8	8.7	7.2
3 55	570	8.1	53.0	138	32.3	.610	5.9	.055	.371	2020	18.2	6.2	.9	99.1	29.5	30.5
4 25	570	13.6	23.9	63	21.2	.886	9.7	.097	.539	2000	21.2	2.7	.4	9.3	8.9	7.2
5 10	570	15.7	9.2	29	16.8	1.831	3.9	.093	1.119	1980	23.3	2.5	.3	1.9	9.9	2.0
6 25	570	13.6	23.8	63	21.2	.890	9.6	.097	.541	1990	21.2	3.6	.4	9.0	8.9	7.2
7 90	570	2.2	87.5	225	59.9	.627	1.3	.073	.382	2090	13.7	67.1	93.5	13.9	32.0	38.7
8 25	570	13.6	23.7	63	20.9	.881	9.7	.099	.536	1980	20.6	2.6	.2	7.3	8.3	7.1
9 CT	570	23.9	0.0	0	0.0	I	I	.005	I	2000	208.6	0.0	0.0	0.0	0.0	0.0
1 I	570	18.2	0.0	0	3.9	R	R	.097	R	600	21.3	10.8	3.9	.5	9.7	0.0
2 25	570	13.6	24.0	63	21.8	.909	9.7	.098	.553	2000	21.0	9.0	.9	8.9	8.7	7.2
3 55	570	8.1	52.8	138	32.0	.606	6.9	.056	.368	2010	18.0	12.6	.8	51.1	29.3	30.2
4 25	570	13.6	23.8	63	20.8	.872	9.0	.099	.531	1990	20.5	3.7	.4	7.5	8.3	7.2
5 10	570	15.7	9.6	25	16.6	1.735	3.9	.093	1.056	1980	23.3	2.2	.3	1.9	9.9	2.1
6 25	570	13.6	24.0	63	21.2	.889	5.0	.098	.538	2000	21.0	2.8	.4	9.5	8.9	7.2
7 90	570	2.2	88.5	226	55.9	.632	1.3	.079	.389	2060	13.5	56.9	93.5	13.6	32.6	38.9
8 25	570	13.6	23.9	63	20.9	.875	3.7	.099	.532	1990	20.3	2.1	.3	7.0	8.3	7.2
9 CT	570	23.9	0.0	0	0.0	I	I	.005	I	2000	209.8	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .8 65 9.9
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 69 5.1

TWO CYCLE COMPOSITE -

HC- FID	0.35(.8) + 0.65(.9) =	.899	G/KW HR	(.671 BS)		
CO- NDIR	0.35(65.3) + 0.65(68.6) =	67.956	G/KW HR	(50.302 BS)		
NOX-CL	0.35(9.9) + 0.65(5.1) =	5.013	G/KW HR	(3.738 BS)		
	HC + NOX =	5.912	G/KW HR	(9.409 BS)		
	SFC =	.960	KG/KW HR	(.756 BS)		

ID = ECU SET.

TABLE E-43. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-237 RUN-02R 09-02-76 EFI-TR-HEI WAIXCT-.53,92 BPEGRXM1+9-570ECU WVA K= 1.093 HUM= 16.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	HT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	956	.969	9.12	90	9.639	1729	9	169	3	.232	2.1	39	.6	0.0	965
2 25 PCT T	189	.136	9.32	630	9.976	8255	17	240	199	.077	1.3	18	15.3	17.9	389
3 55 PCT T	72	.170	11.36	1899	11.538	12796	9	379	791	.147	1.3	56	108.9	39.6	269
4 25 PCT T	88	.120	9.32	650	9.950	8079	8	207	201	.077	.6	16	15.5	17.9	391
5 10 PCT T	200	.197	6.19	130	8.309	6123	16	220	35	.057	.9	13	2.0	7.5	937
6 25 PCT T	108	.125	9.22	560	9.357	7983	10	216	173	.077	.8	17	13.3	17.9	391
7 90 PCT T	972	3.210	12.79	220	16.059	25089	85	10131	125	.113	9.6	1195	14.1	65.6	58
8 25 PCT T	90	.093	9.64	680	9.737	8029	9	195	203	.077	.9	12	15.7	17.9	389
9 C.T.	8000	.051	.23	10	1.083	0	0	0	0	.193	0.0	0	0.0	0.0	599
1 IDLE	800	.928	9.22	29	9.735	1729	15	153	2	.232	3.6	36	.9	0.0	965
2 25 PCT T	300	.192	9.32	660	9.995	8029	28	242	202	.077	2.1	19	15.6	17.9	391
3 55 PCT T	120	.159	11.41	1786	11.782	12837	19	349	706	.147	2.1	51	103.8	39.6	269
4 25 PCT T	132	.125	9.43	780	9.570	7983	12	211	236	.077	.9	16	18.2	17.9	389
5 10 PCT T	260	.197	8.09	120	8.215	6033	21	219	32	.057	1.2	12	1.8	7.5	937
6 25 PCT T	130	.125	9.43	650	9.570	7983	12	211	197	.077	.9	16	15.1	17.9	389
7 90 PCT T	980	3.210	12.45	225	15.915	25310	88	10312	130	.113	9.9	1165	14.7	65.9	58
8 25 PCT T	98	.093	9.64	660	9.738	7893	9	152	199	.077	.3	12	19.9	17.8	389
9 C.T.	8000	.051	.23	15	1.083	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOx	F/A	SFC KG/Kw HR	RPM	CALC A/F	----PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 I		18.3	0.0	0	3.8	R	R	.095	R	600	22.6	12.2	3.0	.3	5.0	0.0
2 25		15.3	29.0	63	18.2	.760	8.9	.093	.962	2000	23.0	8.0	1.9	8.3	8.0	7.2
3 55		10.9	53.1	138	28.1	.529	14.2	.052	.322	2020	19.1	7.7	9.2	58.7	23.6	30.9
4 25		15.9	29.0	63	17.8	.793	8.5	.093	.952	2000	23.1	3.7	1.2	8.9	7.8	7.2
5 10		17.2	10.1	26	13.5	1.391	3.5	.038	.816	2000	26.1	5.9	1.0	1.1	9.9	2.2
6 25		15.9	29.0	63	17.6	.739	7.3	.093	.996	2000	23.3	9.6	1.3	7.2	7.7	7.2
7 90		2.3	88.0	226	55.3	.628	1.9	.079	.382	2050	13.6	56.8	87.0	7.6	35.7	38.7
8 25		15.3	29.0	63	17.7	.730	8.6	.095	.999	2000	22.9	1.6	.9	8.9	7.8	7.2
9 CT		23.9	0.0	0	0.0	I	I	.005	I	2000	191.9	0.0	0.0	0.0	0.0	0.0
1 I		18.3	0.0	0	3.8	R	R	.095	R	600	22.3	17.0	2.7	.2	5.0	0.0
2 25		15.9	29.0	63	17.7	.737	8.6	.099	.999	2000	23.0	10.1	1.9	8.9	7.8	7.2
3 55		10.9	53.1	138	28.3	.533	13.5	.059	.329	2020	18.7	10.1	3.9	56.2	23.7	30.3
4 25		15.3	29.0	63	17.6	.739	10.0	.099	.996	2000	22.8	9.9	1.2	9.8	7.7	7.2
5 10		17.2	10.0	26	13.3	1.329	9.2	.038	.808	1990	26.9	5.6	.9	1.0	9.3	2.2
6 25		15.3	29.0	63	17.6	.739	8.3	.099	.996	2000	22.8	9.3	1.2	8.2	7.7	7.2
7 90		2.3	88.9	225	55.8	.631	1.5	.073	.389	2060	13.7	97.0	87.8	7.9	36.0	38.8
8 25		15.3	23.8	63	17.9	.730	8.3	.095	.999	1990	22.9	1.6	.9	8.1	7.6	7.1
9 CT		23.9	0.0	0	0.0	I	I	.005	I	2000	191.9	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .9 70 9.8

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 1.1 70 9.8

TWO CYCLE COMPOSITE -

HC- FID	0.35(.9) + 0.65(1.1) =	1.036	G/KW HR	(.773 BS)
CO- NDIR	0.35(69.7) + 0.65(70.2) =	70.027	G/KW HR	(52.219 BS)
NOX-CL	0.35(9.8) + 0.65(9.8) =	9.789	G/KW HR	(7.296 BS)
	HC + NOX =	10.820	G/KW HR	(8.068 BS)
	SFC =	.919	KG/KW HR	(.681 BS)

ID =

TABLE E-44. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-237 RUN-01X 09-02-76 EFI-TR-BPEGR RUN 01R WITH INSERTED MODE 7 K= 1.097 HUM= 16.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	900	.590	9.32	91	9.903	1769	8	195	3	.232	1.8	45	.6	0.0	962
2 25 PCT T	69	.051	10.19	300	10.298	9939	7	100	106	.077	.5	8	8.2	17.9	345
3 55 PCT T	98	.030	12.12	705	12.156	19651	6	74	309	.197	.9	11	45.5	39.6	206
4 25 PCT T	52	.030	10.30	330	10.336	9616	5	57	112	.077	.4	4	8.6	17.9	345
5 10 PCT T	76	.040	9.32	105	9.369	7620	7	67	31	.057	.4	4	1.8	6.9	399
6 25 PCT T	70	.035	10.30	320	10.343	9616	7	66	108	.077	.5	5	8.3	17.8	345
7 90 PCT T	17	.098	14.70	800	14.800	20820	3	279	910	.113	.3	32	96.3	69.6	53
8 25 PCT T	52	.020	10.69	270	10.666	9480	5	36	87	.077	.4	3	6.7	17.7	345
9 C.T.	7090	.061	.23	5	.997	0	0	0	0	.193	0.0	0	0.0	0.0	599
1 IDLE	990	.590	9.69	33	10.228	1769	8	188	2	.232	1.9	44	.5	0.0	962
2 25 PCT T	200	.082	10.30	320	10.909	9888	21	158	111	.077	1.6	12	8.5	17.9	345
3 55 PCT T	116	.030	12.25	770	12.293	19515	15	72	331	.197	2.2	11	98.7	39.5	206
4 25 PCT T	88	.035	10.69	290	10.685	9935	9	63	93	.077	.7	5	7.2	17.8	345
5 10 PCT T	80	.090	9.32	108	9.369	7530	7	66	32	.057	.4	4	1.8	7.1	399
6 25 PCT T	69	.035	10.41	350	10.452	9616	6	66	117	.077	.5	5	9.0	17.9	345
7 90 PCT T	17	.098	14.70	800	14.800	20820	3	279	910	.113	.3	32	96.3	69.6	53
8 25 PCT T	50	.025	10.76	270	10.791	9480	5	45	86	.077	.4	3	6.7	17.8	345
9 C.T.	6800	.109	.23	6	1.016	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	570	18.2	0.0	0	3.9	R	R	.096	R	600	22.0	39.0	90.6	.5	9.9	0.0
2 25	570	13.6	29.0	63	21.9	.919	9.5	.097	.556	2000	21.9	9.8	6.9	6.5	9.2	7.2
3 55	570	8.1	53.1	138	32.3	.608	5.9	.055	.370	2020	18.2	17.8	9.7	36.1	25.9	30.6
4 25	570	13.6	29.0	63	21.2	.884	9.7	.097	.538	2000	21.2	7.7	3.9	6.8	8.9	7.3
5 10	570	15.7	9.2	29	16.8	1.827	3.9	.093	1.112	1980	23.3	7.2	3.9	1.9	5.2	2.1
6 25	570	13.6	23.9	63	21.2	.888	9.6	.097	.540	1990	21.2	10.3	9.6	6.6	8.9	7.2
7 90	390	2.1	86.6	227	95.9	.530	9.8	.066	.322	2000	15.1	5.8	28.9	36.7	28.3	38.9
8 25	570	13.6	23.8	63	20.9	.879	3.7	.099	.535	1980	20.6	7.9	2.5	5.3	8.8	7.2
9 CT	570	23.9	0.0	0	0.0	I	I	.005	I	2000	208.6	0.0	0.0	0.0	0.0	0.0
1 I	570	18.2	0.0	0	3.9	R	R	.097	R	600	21.3	29.1	38.0	.9	5.0	0.0
2 25	570	13.6	29.0	63	21.8	.907	9.7	.098	.552	2000	21.0	20.0	10.6	6.6	9.2	7.3
3 55	570	8.1	52.9	138	32.0	.605	6.9	.056	.368	2010	18.0	28.0	9.2	37.8	25.8	30.5
4 25	570	13.6	23.9	63	20.8	.871	9.0	.099	.530	1990	20.5	8.2	9.2	5.6	8.8	7.2
5 10	570	15.7	9.6	25	16.6	1.732	3.9	.093	1.053	1980	23.3	5.0	3.3	1.9	5.2	2.1
6 25	570	13.6	24.0	63	21.2	.882	5.0	.098	.537	2000	21.0	6.2	9.9	7.0	8.9	7.3
7 90	390	2.1	86.6	227	95.9	.530	9.8	.066	.322	2000	15.1	3.8	27.9	36.0	28.9	38.9
8 25	570	13.6	23.9	63	20.9	.873	3.7	.099	.531	1990	20.3	9.6	3.0	5.2	8.8	7.2
9 CT	570	23.9	0.0	0	0.0	I	I	.005	I	2000	209.8	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 6 6.8

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 6 6.9

TWO CYCLE COMPOSITE -

HC- FID 0.35(.3) + 0.65(.9) = .379 G/KW HR (.283 G/HP HR)

CO- NDIR 0.35(6.0) + 0.65(6.2) = 6.107 G/KW HR (9.554 G/HP HR)

NOX-CL 0.35(6.8) + 0.65(6.9) = 6.853 G/KW HR (5.110 G/HP HR)

HC + NOX = 7.232 G/KW HR (5.393 G/HP HR)

SFC = .937 KG/KW HR (.718 G/HP HR)

ID = ECU SET

TABLE E-45. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-237 RUN-02X 09-02-76 EFI-TR-BPEGR RUN 02R WITH INSERTED MODE 7 K= 1.097 HUM= 16.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	956	.969	9.12	90	9.639	1729	9	169	3	.232	2.1	39	.6	0.0	965
2 25 PCT T	189	.136	9.32	630	9.976	8255	17	290	200	.077	1.3	18	15.9	17.9	389
3 55 PCT T	72	.170	11.36	1899	11.538	12796	9	379	749	.197	1.3	56	109.9	39.7	269
4 25 PCT T	88	.120	9.32	650	9.950	8079	8	207	202	.077	.6	16	15.6	17.9	391
5 10 PCT T	200	.197	8.19	130	8.309	6123	16	220	35	.057	.9	13	2.0	7.5	937
6 25 PCT T	108	.125	9.22	560	9.357	7983	10	216	174	.077	.8	17	13.9	17.9	391
7 90 PCT T	17	.098	19.70	800	19.800	20820	3	279	910	.113	.3	32	96.3	69.6	53
8 25 PCT T	90	.093	9.69	680	9.737	8029	9	155	209	.077	.3	12	15.7	17.9	389
9 C.T.	8000	.051	.23	10	1.083	0	0	0	0	.193	0.0	0	0.0	0.0	599
1 IDLE	800	.928	9.22	29	9.735	1729	15	153	2	.232	3.6	36	.9	0.0	965
2 25 PCT T	300	.192	9.32	660	9.995	8029	28	292	203	.077	2.1	19	15.7	17.9	391
3 55 PCT T	120	.159	11.61	1786	11.782	12837	19	399	709	.197	2.1	51	109.2	39.7	269
4 25 PCT T	132	.125	9.93	780	9.570	7983	12	211	237	.077	.9	16	18.2	17.9	389
5 10 PCT T	260	.197	8.09	120	8.215	6033	21	219	32	.057	1.2	12	1.8	7.5	937
6 25 PCT T	130	.125	9.93	650	9.570	7983	12	211	197	.077	.9	16	15.2	17.9	389
7 90 PCT T	17	.098	19.70	800	19.800	20820	3	279	910	.113	.3	32	96.3	69.6	53
8 25 PCT T	98	.093	9.69	660	9.738	7893	9	152	195	.077	.7	12	15.0	17.8	389
9 C.T.	8000	.051	.23	15	1.083	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	570	18.3	0.0	0	3.8	R	R	.099	R	600	22.6	27.2	19.9	.3	5.9	0.0
2 25	570	15.3	29.0	63	18.2	.758	8.5	.093	.961	2000	23.0	17.7	9.1	7.0	8.5	7.2
3 55	570	10.9	53.2	138	28.1	.528	19.2	.052	.321	2020	19.1	17.1	27.6	50.4	25.1	30.6
4 25	570	15.9	29.0	63	17.8	.741	8.6	.093	.951	2000	23.1	8.3	7.9	7.1	8.3	7.2
5 10	570	17.2	10.1	26	13.5	1.338	3.5	.038	.819	2000	26.1	11.9	6.2	.9	9.7	2.2
6 25	570	15.9	29.0	63	17.6	.732	7.9	.093	.995	2000	23.3	10.2	8.2	6.1	8.2	7.2
7 90	390	2.1	86.6	227	95.9	.530	9.8	.066	.322	2000	15.1	9.1	15.6	21.2	31.5	38.3
8 25	570	15.3	29.0	63	17.7	.736	8.6	.095	.998	2000	22.9	3.6	5.9	7.2	8.3	7.2
9 CT	570	23.9	0.0	0	0.0	I	I	.005	I	2000	191.9	0.0	0.0	0.0	0.0	0.0
1 I	570	18.3	0.0	0	3.8	R	R	.095	R	600	22.3	31.2	18.3	.2	5.9	0.0
2 25	570	15.9	29.1	63	17.7	.736	8.6	.099	.998	2000	23.0	18.5	9.6	7.2	8.3	7.2
3 55	570	10.9	53.2	138	28.3	.532	13.5	.059	.323	2020	18.7	18.6	26.5	98.0	25.9	30.6
4 25	570	15.3	29.0	63	17.6	.732	10.0	.099	.995	2000	22.8	8.0	8.9	8.9	8 3	7.2
5 10	570	17.2	10.0	26	13.3	1.326	3.3	.038	.807	1990	26.9	10.2	6.9	.8	9.6	2.2
6 25	570	15.3	29.0	63	17.6	.732	8.9	.099	.995	2000	22.8	7.9	8.9	7.0	8.3	7.2
7 90	390	2.1	86.6	227	95.9	.530	9.8	.066	.322	2000	15.1	2.7	16.3	21.9	31.6	38.3
8 25	570	15.3	23.9	63	17.9	.728	8.3	.095	.993	1990	22.9	2.8	6.0	6.9	8.2	7.2
9 CT	570	23.9	0.0	0	0.0	I	I	.005	I	2000	191.9	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .9 11 11.7

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .6 10 11.6

TWO CYCLE COMPOSITE -

HC- FID 0.35(.9) + 0.65(.6) = .591 G/KW HR (.793 BS)

CO- NDIR 0.35(10.8) + 0.65(10.9) = 10.922 G/KW HR (7.897 BS)

NOX-CL 0.35(11.7) + 0.65(11.6) = 11.628 G/KW HR (8.671 BS)

HC + NOX = 12.168 G/KW HR (9.079 BS)

SFC = .391 KG/KW HR (.642 BS)

ID = ECU SET.

TABLE E-46. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-239 RUN-01 08-25-76 EFI-1R-HEI NOAI-9BTDC IDLE MODE K= 1.079 HUM= 19.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	950	1360	.120	11.99	93	12.241	1361	17	27	2	16.8	27	1.7	0.0	919
2	980	1569	.389	12.25	99	12.819	1997	20	92	2	20.5	92	2.0	0.0	932
3	500	2098	1.350	11.99	50	13.570	1588	27	319	2	26.9	319	2.1	0.0	999
4	510	2969	2.500	11.36	50	14.138	1678	33	599	2	33.0	599	2.1	0.0	950
5	515	2672	3.210	11.00	49	14.512	1729	36	770	2	35.9	770	2.1	0.0	952

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	300	16.5	0.0	0	3.0	R	R	R	R	18.0	.056	R	R	R	R
2	400	17.0	0.0	0	3.3	R	R	R	R	17.2	.058	R	R	R	R
3	500	17.5	0.0	0	3.5	R	R	R	R	16.1	.062	R	R	R	R
4	600	17.7	0.0	0	3.7	R	R	R	R	15.3	.065	R	R	R	R
5	700	17.8	0.0	0	3.8	R	R	R	R	14.9	.067	R	R	R	R

ID = ECU SET

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-239 RUN-02 08-25-76 EFI-1R-HEI NOAI-14BTDC 10 PCT MODE K= 1.079 HUM= 19.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	1920	11	.005	10.69	60	10.696	8800	1	8	16	1.0	8	17.7	6.6	317
2	1920	11	.005	11.98	97	11.986	8119	1	7	23	.9	7	29.9	6.9	366
3	1930	9	.005	11.73	98	11.736	7666	1	7	21	.7	7	22.8	7.0	396
4	1920	9	.005	12.38	135	12.385	7167	0	6	26	.3	6	27.8	7.0	417
5	1930	2	.005	12.79	178	12.795	7076	0	6	33	.1	6	35.1	7.0	429
6	1930	1	.005	13.07	215	13.075	7031	0	5	38	.1	5	41.2	7.3	432
7	1920	1	.005	13.35	225	13.355	6985	0	5	39	.1	5	42.0	7.3	439
8	1920	1	.005	13.49	230	13.495	6909	0	5	38	.1	5	41.3	7.0	447

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------- HC	CO	NOX	SFC KG/KW HR
1	300	12.5	8.9	29	19.9	.11	.95	1.88	2.178	20.6	.049	.15	1.28	2.52	1.325
2	400	14.9	9.3	25	17.9	.09	.78	2.49	1.929	19.2	.052	.13	1.05	3.39	1.170
3	500	15.6	9.9	25	16.9	.07	.72	2.31	1.805	18.8	.053	.10	.96	3.10	1.098
4	600	16.4	9.3	24	15.8	.03	.69	2.89	1.692	17.8	.056	.04	.86	3.81	1.029
5	700	16.7	9.9	24	15.6	.01	.61	3.56	1.660	17.3	.058	.02	.82	4.77	1.010
6	800	17.0	9.8	27	15.5	.01	.57	4.02	1.585	17.0	.059	.01	.76	5.39	.964
7	900	17.3	9.7	27	15.4	.01	.56	4.11	1.583	16.6	.060	.01	.75	5.51	.963
8	1000	17.6	9.9	26	15.0	.01	.56	4.21	1.603	16.5	.061	.01	.75	5.65	.975

ID = ECU SET

TABLE E-47. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-239 RUN-03 08-25-76 EFI-TR-HEI NOAI-14BTDC 25 PCT MODE K= 1.072 HUM= 14.7 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	1960	1	.010	11.00	110	11.010	10705	0	20	36	.1	20	38.1	17.6	251
2	1950	1	.010	11.73	200	11.740	9707	0	17	55	.1	17	58.8	17.3	323
3	1950	1	.010	12.52	340	12.530	9253	0	15	83	.1	15	89.4	17.3	351
4	1960	1	.010	13.07	430	13.080	9026	0	14	99	.1	14	105.6	17.4	371
5	1960	1	.010	13.35	500	13.360	8936	0	14	111	.1	14	119.0	17.1	389
6	1960	2	.010	14.08	590	14.090	8890	0	13	129	.1	13	132.5	17.7	391
7	1970	1	.020	14.23	660	14.250	8981	0	26	138	.1	26	148.0	17.8	399

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	300	9.9	23.6	63	23.6	.00	.85	1.53	.999	20.0	.050	.01	1.19	2.06	.608
2	400	12.7	23.1	62	21.9	.00	.79	2.92	.925	18.8	.053	.01	.99	3.25	.563
3	500	13.8	23.1	62	20.9	.00	.64	3.68	.882	17.7	.057	.00	.88	4.99	.536
4	600	14.6	23.3	62	19.9	.00	.61	4.33	.859	17.0	.059	.00	.82	5.80	.519
5	700	15.1	22.9	61	19.7	.00	.60	4.96	.860	16.6	.060	.00	.81	6.65	.523
6	800	15.9	23.7	63	19.6	.01	.55	5.39	.828	15.8	.063	.01	.79	7.16	.503
7	900	15.5	23.8	63	19.8	.00	1.10	5.99	.832	15.6	.064	.00	1.98	7.96	.506

ID = ECU SET

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-239 RUN-04 08-25-76 EFI-TR-HEI NOAI-14BTDC 55 PCT MODE K= 1.072 HUM= 14.7 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	1990	1	.010	11.36	580	11.370	19787	0	26	169	.1	26	175.9	39.1	102
2	2000	2	.010	11.86	600	11.870	19515	0	25	299	.3	25	261.1	39.6	137
3	1990	2	.010	12.79	992	12.800	19061	0	22	362	.2	22	387.8	39.4	178
4	1980	3	.015	13.49	1415	13.505	13608	0	31	473	.3	31	507.9	38.9	218
5	1980	3	.020	14.23	1527	14.250	13295	0	38	471	.3	38	505.1	38.9	241
6	2020	25	.159	14.59	1505	14.701	13789	3	300	969	2.7	300	502.3	40.0	249
7	2020	990	.771	14.23	1346	15.051	14107	97	1960	919	97.0	1960	998.9	40.0	259

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	200	9.0	52.5	138	32.6	.00	.51	3.21	.622	19.9	.052	.00	.69	9.30	.378
2	300	5.9	53.1	139	32.0	.01	.98	9.70	.603	18.6	.054	.01	.69	6.31	.367
3	400	7.0	52.8	139	31.0	.00	.93	7.02	.587	17.3	.058	.01	.58	9.92	.357
4	500	8.6	52.2	139	30.0	.01	.60	9.30	.575	16.9	.061	.01	.81	12.97	.350
5	600	9.5	52.2	139	29.2	.01	.79	9.26	.559	15.6	.064	.01	.99	12.92	.340
6	700	9.8	53.7	140	30.4	.05	5.79	8.96	.566	15.2	.066	.07	7.70	12.02	.344
7	800	10.0	53.7	140	31.1	.90	27.91	8.01	.579	14.7	.068	1.20	37.92	10.79	.352

ID = ECU SET

TABLE E-48. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-239 RUN-05R 08-26-76 EFI-TR-HEI NOAI-19BTDC 90 PCT MODE K= 1.077 HUM= 15.1 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	9	.010	13.35	2066	13.360	19096	1	29	980	.6	29	1056.3	69.6	8
2	2000	3	.010	13.35	2155	13.360	18779	0	28	1007	.5	28	1085.5	69.7	96
3	1990	100	.312	13.93	2008	14.253	18733	15	828	876	14.9	828	999.0	69.5	61
4	2000	960	1.178	13.78	1889	15.067	19919	191	3065	808	190.8	3065	870.7	69.9	69
5	2000	1360	1.980	13.35	1572	15.485	19913	200	5193	671	199.7	5193	723.1	65.0	76
6	2000	1520	2.760	12.93	1253	15.864	20276	222	7126	532	222.5	7126	572.8	65.0	81

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	150	.3	86.7	228	92.1	.01	.39	11.60	.986	16.6	.060	.01	.96	15.55	.295
2	200	1.8	86.8	228	91.9	.01	.39	11.92	.977	16.6	.060	.01	.95	15.98	.290
3	250	2.9	86.5	228	91.3	.18	9.85	10.92	.978	15.6	.069	.29	13.21	13.97	.291
4	300	2.7	87.1	229	92.8	1.67	36.25	9.56	.992	14.7	.068	2.23	48.62	12.82	.299
5	350	3.0	87.1	229	93.9	2.36	60.89	7.99	.509	14.2	.070	3.17	81.58	10.65	.306
6	400	3.2	87.1	229	94.7	2.63	84.29	6.29	.513	13.8	.073	3.53	113.03	8.43	.312

ID = ECU SET

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-239 RUN-06 08-25-76 EFI-TR-HEI NOAI-19BTDC CT MODE K= 1.058 HUM= 13.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	7360	.090	.15	9	.928	0	0	0	0	0.0	0	0.0	0.0	625
2	2000	20160	.090	.15	9	2.210	95	91	2	0	91.9	2	.0	0.0	625
3	2000	28800	.051	.15	6	3.081	136	127	5	0	127.2	5	.1	0.0	625
4	2000	48600	.077	.15	6	5.037	459	433	14	0	433.2	14	.2	0.0	622
5	2000	51200	.115	.23	7	5.481	590	553	25	0	552.6	25	.3	0.0	622

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOx	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	OFF	29.3	0.0	0	0.0	I	I	I	I	229.1	.009	I	I	I	I
2	700	29.6	0.0	0	.1	R	R	R	R	92.8	.011	R	R	R	R
3	800	29.6	0.0	0	.3	R	R	R	R	65.9	.015	R	R	R	R
4	900	29.5	0.0	0	1.0	R	R	R	R	39.6	.025	R	R	R	R
5	1000	29.5	0.0	0	1.3	R	R	R	R	26.2	.028	R	R	R	R

ID = ECU SET

TABLE E-49. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-239 RUN-X 08-26-76 EFI-TR-HET MODAL-NOAI-19BTDC-ECU=ID K= 1.058 HUM= 13.8 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	1360	.120	11.99	93	12.261	1361	17	27	2	.232	3.9	6	.9	0.0	919
2 25 PCT T	1	.010	12.52	390	12.530	9253	0	15	88	.077	.0	1	6.8	17.3	351
3 55 PCT T	2	.010	11.86	600	11.870	19515	0	25	258	.197	.0	5	37.9	39.6	137
4 25 PCT T	1	.010	12.52	390	12.530	9253	0	15	88	.077	.0	1	6.8	17.3	351
5 10 PCT T	4	.005	12.38	135	12.385	7167	0	6	27	.057	.0	0	1.6	7.0	917
6 25 PCT T	1	.010	12.52	390	12.530	9253	0	15	88	.077	.0	1	6.8	17.3	351
7 90 PCT T	100	.312	13.93	2008	14.253	18733	15	828	927	.113	1.7	94	109.8	64.9	61
8 25 PCT T	1	.010	12.52	390	12.530	9253	0	15	88	.077	.0	1	6.8	17.3	351
9 C.T.	7360	.090	.15	9	.928	0	0	0	0	.193	0.0	0	0.0	0.0	625
1 IDLE	1360	.120	11.99	93	12.261	1361	17	27	2	.232	3.9	6	.9	0.0	919
2 25 PCT T	1	.010	12.52	390	12.530	9253	0	15	88	.077	.0	1	6.8	17.3	351
3 55 PCT T	2	.010	11.86	600	11.870	19515	0	25	258	.197	.0	5	37.9	39.6	137
4 25 PCT T	1	.010	12.52	390	12.530	9253	0	15	88	.077	.0	1	6.8	17.3	351
5 10 PCT T	4	.005	12.38	135	12.385	7167	0	6	27	.057	.0	0	1.6	7.0	917
6 25 PCT T	1	.010	12.52	390	12.530	9253	0	15	88	.077	.0	1	6.8	17.3	351
7 90 PCT T	100	.312	13.93	2008	14.253	18733	15	828	927	.113	1.7	94	109.8	64.9	61
8 25 PCT T	1	.010	12.52	390	12.530	9253	0	15	88	.077	.0	1	6.8	17.3	351
9 C.T.	7360	.090	.15	9	.928	0	0	0	0	.193	0.0	0	0.0	0.0	625

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- RV	CHP	CTQ	FC	BSFC	BSNOx	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	300	16.5	0.0	0	3.0	R	R	.056	R	950	18.0	68.9	5.8	.2	9.0	0.0
2 25	500	13.8	23.1	62	20.9	.882	3.9	.057	.536	1950	17.7	.1	1.1	9.0	9.1	7.1
3 55	300	5.9	53.1	139	32.0	.603	5.0	.059	.367	2000	18.6	.7	3.3	22.1	27.3	31.0
4 25	500	13.8	23.1	62	20.9	.882	3.9	.057	.536	1950	17.7	.1	1.1	9.0	9.1	7.1
5 10	600	16.9	9.3	26	15.8	1.692	3.0	.056	1.029	1920	17.8	.3	.3	.9	5.2	2.1
6 25	500	13.8	23.1	62	20.9	.882	3.9	.057	.536	1950	17.7	.1	1.1	9.0	9.1	7.1
7 90	250	2.9	86.3	228	91.3	.978	11.0	.069	.291	1990	15.6	29.7	86.3	61.0	27.1	30.7
8 25	500	13.8	23.1	62	20.9	.882	3.9	.057	.536	1950	17.7	.1	1.1	9.0	9.1	7.1
9 CT	OFF	29.6	0.0	0	0.0	I	I	.009	I	2000	229.1	0.0	0.0	0.0	0.0	0.0
1 I	300	16.5	0.0	0	3.0	R	R	.056	R	950	18.0	68.9	5.8	.2	9.0	0.0
2 25	500	13.8	23.1	62	20.9	.882	3.9	.057	.536	1950	17.7	.1	1.1	9.0	9.1	7.1
3 55	300	5.9	53.1	139	32.0	.603	5.0	.059	.367	2000	18.6	.7	3.3	22.1	27.3	31.0
4 25	500	13.8	23.1	62	20.9	.882	3.9	.057	.536	1950	17.7	.1	1.1	9.0	9.1	7.1
5 10	600	16.9	9.3	26	15.8	1.692	3.0	.056	1.029	1920	17.8	.3	.3	.9	5.2	2.1
6 25	500	13.8	23.1	62	20.9	.882	3.9	.057	.536	1950	17.7	.1	1.1	9.0	9.1	7.1
7 90	250	2.9	86.3	228	91.3	.978	11.0	.069	.291	1990	15.6	29.7	86.3	61.0	27.1	30.7
8 25	500	13.8	23.1	62	20.9	.882	3.9	.057	.536	1950	17.7	.1	1.1	9.0	9.1	7.1
9 CT	OFF	29.6	0.0	0	0.0	I	I	.009	I	2000	229.1	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 6 9.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .3 6 9.9

TWO CYCLE COMPOSITE -

HC- FID 0.35(.3) + 0.65(.3) = .308 G/KW HR (.230 GS)

CO- NDIR 0.35(5.9) + 0.65(5.9) = 5.906 G/KW HR (4.409 GS)

NOX-CL 0.35(9.9) + 0.65(9.9) = 9.360 G/KW HR (6.979 GS)

HC + NOX = 9.668 G/KW HR (7.209 GS)

SFC = .916 KG/KW HR (.684 GS)

ID = FCU SET

TABLE E-50. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-290 RUN-01 08-25-76 EFI-TR-HEI NOAI-30BTDC 10 PCT MODE K= 1.053 HUM= 13.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	1970	100	.051	9.96	63	10.022	7076	8	73	15	7.7	73	15.5	7.2	376
2	1970	90	.030	10.69	96	10.675	6577	3	38	20	2.7	38	20.7	7.5	909
3	1990	26	.030	11.29	135	11.273	6986	2	35	26	1.7	35	27.1	7.5	929
4	1980	23	.025	11.98	150	11.508	6078	1	27	26	1.3	27	27.7	6.9	999
5	1990	20	.020	11.99	290	12.012	6033	1	20	90	1.1	20	92.1	7.5	952
6	2000	18	.020	12.25	260	12.272	6169	1	20	93	1.0	20	95.7	7.3	957
7	2000	118	.020	12.52	300	12.553	6078	6	20	98	6.9	20	50.8	7.6	965
8	1990	10	.020	12.45	300	12.671	5897	1	19	96	.5	19	98.8	7.0	975

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	300	19.8	9.6	26	15.6	.82	7.79	1.57	1.621	21.8	.096	1.10	10.38	2.11	.986
2	900	16.1	10.0	27	19.5	.28	3.87	2.01	1.999	20.6	.099	.37	5.19	2.70	.881
3	500	16.9	10.1	27	19.3	.17	3.57	2.62	1.919	19.5	.051	.22	4.79	3.51	.860
4	600	17.5	9.3	25	13.9	.15	2.97	2.91	1.993	19.1	.052	.20	3.98	3.90	.878
5	700	17.8	10.1	27	13.3	.11	2.07	4.06	1.315	18.9	.059	.15	2.78	5.45	.800
6	800	16.8	9.8	26	13.6	.11	2.19	4.56	1.392	18.0	.056	.19	2.87	6.11	.897
7	900	18.3	10.2	27	13.9	.49	1.99	4.87	1.320	17.6	.057	.86	2.66	6.53	.803
8	1000	18.7	9.3	25	13.0	.06	2.08	5.10	1.399	17.5	.057	.08	2.79	6.89	.848

ID = ECU SET

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-290 RUN-02 08-25-76 EFI-TR-HEI NOAI-30BTDC 25 PCT MODE K= 1.053 HUM= 13.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2010	9	.090	10.76	175	10.801	9072	0	69	99	.9	69	51.9	18.1	323
2	2000	2	.090	11.98	390	11.521	8391	0	60	82	.2	60	86.6	17.7	363
3	2000	0	.030	12.25	550	12.280	8210	0	91	122	0.0	91	128.5	18.0	389
4	2000	0	.030	12.79	800	12.820	8119	0	39	168	0.0	39	177.1	18.0	399
5	2010	1	.030	13.35	960	13.380	8029	0	37	191	.1	37	201.3	18.1	909
6	2020	1	.025	13.99	992	13.515	7897	0	30	191	.1	30	201.3	18.2	917
7	2000	0	.025	13.78	79	13.805	7530	0	28	13	0.0	28	14.1	17.7	929

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	300	12.7	29.3	43	20.0	.02	2.90	2.06	.823	20.3	.099	.02	3.88	2.76	.501
2	900	19.3	23.8	42	18.5	.01	2.57	3.59	.778	19.1	.052	.01	3.99	4.75	.973
3	500	15.1	29.2	43	18.1	0.00	1.73	5.17	.799	18.0	.056	0.00	2.32	6.93	.956
4	600	15.7	29.2	43	17.9	0.00	1.69	7.12	.791	17.3	.058	0.00	2.20	9.55	.951
5	700	16.1	29.3	43	17.7	.00	1.55	8.06	.729	16.6	.060	.00	2.08	10.81	.993
6	800	16.9	29.9	43	17.3	.00	1.29	8.02	.709	16.9	.061	.00	1.66	10.75	.931
7	900	16.7	23.8	42	16.6	0.00	1.20	.58	.698	16.1	.062	0.00	1.60	.77	.929

ID = ECU SET

TABLE E-51. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

ENGINE-2 TEST-290 RUN-03 1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
08-25-76 EFI-TR-HEI NOAI-240TDC 55 PCT MODE K= 1.072 HUM= 19.7 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2020	2	.025	11.36	580	11.385	19696	0	66	299	.3	66	266.9	39.7	109
2	2020	2	.025	11.73	650	11.755	13608	0	59	250	.3	59	267.8	39.7	160
3	2030	1	.030	12.79	1323	12.920	13063	0	62	498	.1	62	479.7	39.9	221
4	2030	3	.030	13.44	1849	13.671	12837	0	57	576	.3	57	617.9	90.3	296
5	2050	6	.035	14.23	2028	14.266	13109	1	66	619	.6	66	663.1	90.7	262
6	2050	130	.263	14.59	1909	14.818	13336	13	478	570	13.3	478	611.9	90.6	279
7	2050	998	.891	14.23	1849	15.217	13926	85	1587	592	85.3	1567	580.5	90.6	282

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	200	9.1	53.3	139	32.9	.01	1.27	9.79	.608	19.3	.052	.01	1.70	6.92	.370
2	300	6.3	53.3	139	30.0	.00	1.13	9.81	.563	18.8	.053	.01	1.52	6.95	.342
3	400	8.7	53.6	139	28.8	.00	1.20	8.58	.538	17.3	.058	.00	1.60	11.50	.327
4	500	9.7	54.0	140	28.3	.01	1.09	10.97	.529	16.3	.062	.01	1.47	14.70	.319
5	600	10.3	54.5	140	28.9	.01	1.29	11.65	.530	15.6	.064	.02	1.66	15.63	.322
6	700	10.8	54.5	140	29.9	.25	9.01	10.79	.590	15.0	.066	.34	12.08	14.91	.328
7	800	11.1	54.5	140	29.6	1.61	29.90	10.20	.593	14.6	.069	2.15	90.10	13.68	.330

ID = ECU SET

STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

ENGINE-2 TEST-290 RUN-09R 1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
08-26-76 EFI-TR-HEI NOAI-188TDC 90 PCT MODE K= 1.077 HUM= 15.1 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	1990	9	.020	13.49	2746	13.661	18098	1	59	1208	1.3	59	1301.3	69.6	28
2	1980	6	.025	13.93	2785	13.956	17735	1	65	1175	.9	65	1266.0	69.3	53
3	1980	8	.035	14.23	2708	14.266	17695	1	88	1112	1.1	88	1198.1	69.2	79
4	1980	140	.287	14.39	2511	14.693	17917	19	708	1017	19.9	708	1095.3	69.2	81
5	1990	1109	1.290	13.78	2229	15.196	18552	159	3069	906	159.0	3069	976.6	69.5	86
6	1980	1392	1.990	13.35	1659	15.999	18733	193	9752	668	192.7	9752	719.6	69.2	91

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	150	1.1	86.6	229	39.9	.02	.69	19.36	.941	16.3	.061	.02	.86	19.26	.280
2	200	2.1	86.2	229	39.1	.01	.77	19.09	.959	15.9	.063	.01	1.09	18.83	.276
3	250	2.9	86.1	228	38.9	.01	1.06	13.29	.952	15.6	.064	.02	1.42	17.82	.275
4	300	3.2	86.0	228	39.5	.23	8.96	12.15	.959	15.2	.066	.31	11.39	16.29	.279
5	350	3.9	86.5	228	40.9	1.83	34.99	10.78	.973	14.6	.069	2.96	98.93	14.95	.288
6	400	3.6	86.1	228	41.3	2.30	56.78	7.98	.980	14.2	.070	3.09	76.19	10.70	.292

ID = ECU SET

TABLE E-52. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-290 RUN-05 08-25-76 EFI-TH-HEI NOAI-14BTDC 2000RPMCT NL=RPM K= 1.081 HUM= 15.4 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	1910	980	.109	10.07	17	10.226	9309	22	88	2	22.1	88	2.6	0.0	505
2	1925	600	.115	10.30	20	10.488	9269	27	94	3	26.8	94	2.9	0.0	511
3	1910	640	.136	10.53	22	10.737	9082	27	105	3	26.7	105	3.0	0.0	518
4	1350	960	.159	10.53	21	10.796	3856	38	119	2	37.7	119	2.7	0.0	531

MODE	ID	---UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE--- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	700	19.9	0.0	0	9.5	R	R	R	R	21.9	.097	R	R	R	R
2	800	20.1	0.0	0	9.9	R	R	R	R	20.9	.098	R	R	R	R
3	900	20.9	0.0	0	9.0	R	R	R	R	20.9	.099	R	R	R	R
4	1000	20.9	0.0	0	8.5	R	R	R	R	20.9	.099	R	R	R	R

ID = ECU SET

TABLE E-53. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-290 RUN-X 08-25-76 EFI-TR-HEI MODAL-NOAI-MVA19,29,30-ECU=ID K= 1.067 HUM= 19.3 G/KG

MODE		CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	IDLE	1360	.120	11.99	93	12.261	1361	17	27	2	.232	3.9	6	.9	0.0	919
2	25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
3	55 PCT T	2	.025	11.73	650	11.755	13608	0	59	266	.197	.0	9	39.2	39.7	160
4	25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
5	10 PCT T	23	.025	11.98	150	11.508	6078	1	27	28	.057	.1	2	1.6	6.9	999
6	25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
7	90 PCT T	100	.312	13.93	2008	14.253	18733	15	828	935	.113	1.7	99	105.6	64.9	61
8	25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
9	C.T.	7360	.090	.15	9	.928	0	0	0	0	.193	0.0	0	0.0	0.0	625
1	IDLE	1360	.120	11.99	93	12.261	1361	17	27	2	.232	3.9	6	.9	0.0	919
2	25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
3	55 PCT T	2	.025	11.73	650	11.755	13608	0	59	266	.197	.0	9	39.2	39.7	160
4	25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
5	10 PCT T	23	.025	11.98	150	11.508	6078	1	27	28	.057	.1	2	1.6	6.9	999
6	25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
7	90 PCT T	100	.312	13.93	2008	14.253	18733	15	828	935	.113	1.7	99	105.6	64.9	61
8	25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
9	C.T.	7360	.090	.15	9	.928	0	0	0	0	.193	0.0	0	0.0	0.0	625

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOx	FUEL	POWER
1	I	300	16.5	0.0	0	3.0	R	R	.056	R	950	18.0	67.9	9.9	.2	9.3	0.0
2	25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.2	3.6	3.9	8.8	7.2
3	55	300	6.3	53.3	139	30.0	.563	5.1	.053	.392	2020	18.8	.7	6.7	22.5	27.2	30.8
4	25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.2	3.6	3.9	8.8	7.2
5	10	600	17.5	9.3	25	13.9	1.993	3.1	.052	.878	1980	19.1	1.3	1.2	.9	9.7	2.1
6	25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.2	3.6	3.9	8.8	7.2
7	90	250	2.9	86.3	228	91.3	.497	11.1	.069	.291	1990	15.6	29.3	72.9	60.8	28.7	38.3
8	25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.2	3.6	3.9	8.8	7.2
9	CT	OFF	29.6	0.0	0	0.0	I	I	.009	I	2000	229.1	0.0	0.0	0.0	0.0	0.0
1	I	300	16.5	0.0	0	3.0	R	R	.056	R	950	18.0	67.9	9.9	.2	9.3	0.0
2	25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.2	3.6	3.9	8.8	7.2
3	55	300	6.3	53.3	139	30.0	.563	5.1	.053	.392	2020	18.8	.7	6.7	22.5	27.2	30.8
4	25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.2	3.6	3.9	8.8	7.2
5	10	600	17.5	9.3	25	13.9	1.993	3.1	.052	.878	1980	19.1	1.3	1.2	.9	9.7	2.1
6	25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.2	3.6	3.9	8.8	7.2
7	90	250	2.9	86.3	228	91.3	.497	11.1	.069	.291	1990	15.6	29.3	72.9	60.8	28.7	38.3
8	25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.2	3.6	3.9	8.8	7.2
9	CT	OFF	29.6	0.0	0	0.0	I	I	.009	I	2000	229.1	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 7 9.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .3 7 9.9

TWO CYCLE COMPOSITE - HC- FID 0.35(.3) + 0.65(.3) = .310 G/KW HR (.231 BS)

CO- NDIR 0.35(6.9) + 0.65(6.9) = 6.900 G/KW HR (5.175 BS)

NOx-CL 0.35(9.9) + 0.65(9.9) = 9.395 G/KW HR (7.006 BS)

HC + NOx = 9.705 G/KW HR (7.237 BS)

SFC = .388 KG/KW HR (.638 BS)

ID = ECU SET

TABLE E-54. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-290 RUN-XDC 08-26-76 EFI-TR-HEI MODAL-NOAI-MVA-CT1350NLRPM K= 1.067 HUM= 19.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	1360	.120	11.99	93	12.261	1361	17	27	2	.232	3.9	6	.9	0.0	919
2 25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
3 55 PCT T	2	.025	11.73	650	11.755	13608	0	59	266	.197	.0	9	39.2	39.7	160
4 25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
5 10 PCT T	23	.025	11.98	150	11.508	6078	1	27	28	.057	.1	2	1.6	6.9	999
6 25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
7 90 PCT T	100	.312	13.93	2008	19.253	18733	15	828	935	.113	1.7	94	105.6	69.9	61
8 25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
9 C.T.	960	.159	10.53	21	10.799	3956	38	119	3	.193	5.9	16	.9	0.0	531
1 IDLE	1360	.120	11.99	93	12.261	1361	17	27	2	.232	3.9	6	.9	0.0	919
2 25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
3 55 PCT T	2	.025	11.73	650	11.755	13608	0	59	266	.197	.0	9	39.2	39.7	160
4 25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
5 10 PCT T	23	.025	11.98	150	11.508	6078	1	27	28	.057	.1	2	1.6	6.9	999
6 25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
7 90 PCT T	100	.312	13.93	2008	19.253	18733	15	828	935	.113	1.7	94	105.6	69.9	61
8 25 PCT T	2	.090	11.98	390	11.521	8391	0	60	88	.077	.0	5	6.8	17.7	363
9 C.T.	960	.159	10.53	21	10.799	3956	38	119	3	.193	5.9	16	.9	0.0	531

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 I	300	16.5	0.0	0	3.0	R	R	.056	R	950	18.0	35.0	9.3	.2	9.0	0.0
2 25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.1	3.2	3.9	8.2	7.2
3 55	300	6.3	53.3	139	30.0	.563	5.1	.053	.392	2020	18.8	.3	6.0	22.5	25.3	30.8
4 25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.1	3.2	3.9	8.2	7.2
5 10	600	12.5	9.3	25	13.9	1.993	3.1	.052	.878	1980	19.1	.7	1.1	.9	9.9	2.1
6 25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.1	3.2	3.9	8.2	7.2
7 90	250	2.9	86.3	228	91.3	.978	11.1	.064	.291	1990	15.6	15.1	69.7	60.6	26.7	38.3
8 25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.1	3.2	3.9	8.2	7.2
9 CT	1000	20.9	0.0	0	8.5	R	R	.099	R	2000	20.3	48.9	11.3	.2	7.0	0.0
1 I	300	16.5	0.0	0	3.0	R	R	.056	R	950	18.0	35.0	9.3	.2	9.0	0.0
2 25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.1	3.2	3.9	8.2	7.2
3 55	300	6.3	53.3	139	30.0	.563	5.1	.053	.392	2020	18.8	.3	6.0	22.5	25.3	30.8
4 25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.1	3.2	3.9	8.2	7.2
5 10	600	12.5	9.3	25	13.9	1.993	3.1	.052	.878	1980	19.1	.7	1.1	.9	9.9	2.1
6 25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.1	3.2	3.9	8.2	7.2
7 90	250	2.9	86.3	228	91.3	.978	11.1	.064	.291	1990	15.6	15.1	69.7	60.6	26.7	38.3
8 25	900	19.3	23.8	62	18.5	.778	3.8	.052	.973	2000	19.1	.1	3.2	3.9	8.2	7.2
9 CT	1000	20.9	0.0	0	8.5	R	R	.099	R	2000	20.3	48.9	11.3	.2	7.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .6 8 9.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .6 8 9.9

TWO CYCLE COMPOSITE - HC- FID 0.35(.6) + 0.65(.6) = .601 G/KW HR (.999 83)

CO- NDIR 0.35(7.8) + 0.65(7.8) = 7.825 G/KW HR (5.835 83)

NOX-CL 0.35(9.4) + 0.65(9.4) = 9.415 G/KW HR (7.021 83)

HC + NOx = 10.017 G/KW HR (7.469 83)

SFC = .917 KG/KW HR (.686 83)

ID = ECU SET

TABLE E-55. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-291 RUN-01 09-08-76 EFFECT OF INJECTION TIMING EFI-TR-HEI WAI K= 1.105 HUM= 17.9 G/KG

MODE	PPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. HG
1	2000	56	.096	9.86	350	9.912	8209	5	81	102	5.9	81	112.6	17.8	384
2	1990	60	.051	9.86	300	9.917	8618	6	89	87	5.7	89	95.6	17.7	378
3	1990	2	.096	9.86	330	9.906	8259	0	82	97	.2	82	107.0	17.7	378
4	1980	8	.051	9.86	300	9.912	8209	1	90	88	.8	90	96.7	17.6	376

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CID	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	0	15.1	23.9	63	19.2	.23	3.99	9.32	.802	22.1	.045	.31	9.61	5.40	.488
2	22	14.9	23.8	63	19.0	.29	3.80	9.68	.799	22.0	.045	.32	5.10	9.99	.486
3	202	14.9	23.8	63	14.3	.01	3.97	9.12	.811	22.1	.045	.01	9.66	5.53	.499
4	382	14.8	23.7	63	19.2	.03	3.87	3.79	.811	22.1	.045	.09	5.18	5.02	.493

ID = INJ TIMING

TABLE E-56. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-291 RUN-02 09-08-76 EFFECT OF INJECTION TIMING EFI-TR-HEI WAI K= 1.105 HUM= 17.9 G/KG

MODE	PPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. HG
1	2030	11	.025	11.61	1112	11.436	13608	1	60	932	1.9	60	977.0	39.7	296
2	2020	10	.025	11.61	1112	11.436	13562	1	59	930	1.3	59	975.9	39.6	299
3	2020	11	.025	11.61	1136	11.636	13799	1	60	995	1.9	60	992.2	39.6	239
4	2030	13	.025	11.73	1136	11.757	13932	2	58	932	1.7	58	977.5	39.9	299
5	2020	19	.025	11.73	1136	11.757	13799	2	60	991	1.8	60	987.1	39.6	236
6	2030	15	.025	11.61	1136	11.637	13608	2	60	991	1.9	60	987.3	39.8	291

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CID	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	0	9.7	53.3	138	30.0	.03	1.13	8.21	.563	18.9	.053	.09	1.52	11.01	.393
2	22	9.6	53.1	138	29.9	.02	1.13	8.23	.563	18.9	.053	.03	1.52	11.03	.392
3	95	9.2	53.1	138	30.3	.03	1.15	8.52	.571	18.9	.053	.09	1.59	11.92	.397
4	202	9.8	53.6	139	29.7	.03	1.11	8.22	.559	18.7	.053	.09	1.99	11.03	.337
5	382	9.3	53.2	138	30.3	.03	1.19	8.93	.570	18.7	.053	.05	1.53	11.30	.397
6	22	9.5	53.9	138	30.0	.09	1.13	8.39	.562	18.9	.053	.05	1.52	11.25	.392

ID = INJ TIMING

TABLE E-57. MASS EMISSIONS BY NINE-MODE FPA - METRIC UNITS

1975 CHEVROLET 350-CID HO ENGINE---PROJECT 11-9311

ENGINE=2 TEST=293 RUN=01 09-09-76 EFI-TR-HEI-MEGR.53 KAI-16R WVA K= 1.109 HUM= 18.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKR	VAC. MM
1 IDLE	589	.193	9.20	42	9,956	1592	10	63	3	.232	2.4	15	.6	0.0	465
2 25 PCT T	100	.216	11.10	250	11,327	R119	8	312	64	.077	.6	24	5.1	17.7	381
3 55 PCT T	5	.030	13.90	990	13,931	13517	1	61	182	.197	.1	9	26.7	39.2	226
4 25 PCT T	8	.159	11.70	195	11,859	R255	1	223	50	.077	.0	17	3.8	17.9	381
5 10 PCT T	180	.134	8.20	150	8,354	5993	13	179	36	.057	.7	10	2.1	7.2	967
6 25 PCT T	15	.216	11.50	230	11,717	R255	1	307	60	.077	.1	24	4.6	17.9	381
7 90 PCT T	1	.109	15.00	635	15,109	20820	0	289	322	.113	.0	33	36.4	65.2	66
8 25 PCT T	6	.159	11.60	190	11,759	R255	0	225	99	.077	.0	17	7.8	18.0	381
9 C.T.	5120	.010	.08	3	.602	0	0	0	0	.193	0.0	0	0.0	0.0	589
1 IDLE	720	.197	9.20	31	9,926	1592	13	99	2	.232	3.0	11	.9	0.0	465
2 25 PCT T	60	.181	11.10	330	11,288	R119	5	263	87	.077	.4	20	6.7	17.7	389
3 55 PCT T	9	.020	13.90	900	13,921	13562	1	90	199	.197	.1	6	21.1	39.5	226
4 25 PCT T	11	.159	11.70	220	11,860	R210	1	222	56	.077	.1	17	4.3	17.9	381
5 10 PCT T	92	.134	8.20	170	8,346	5988	7	181	91	.057	.4	10	2.3	7.2	967
6 25 PCT T	13	.209	11.50	200	11,706	R119	1	286	51	.077	.1	22	3.9	17.8	381
7 90 PCT T	1	.056	14.90	750	14,956	20820	0	158	385	.113	.0	18	43.5	65.2	66
8 25 PCT T	14	.193	11.20	270	11,349	R145	1	219	72	.077	.1	17	5.5	17.8	381
9 C.T.	5990	.010	.08	5	.439	0	0	0	0	.193	0.0	0	0.0	0.0	589

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- WV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	970	18.3	0.0	0	3.9	R	R	.093	R	600	23.0	60.0	9.9	.2	4.7	0.0
2 25	590	15.0	23.7	63	17.9	.759	2.8	.052	.959	1990	19.9	15.2	16.2	6.1	8.3	7.2
3 55	500	8.9	52.6	138	29.8	.566	3.5	.060	.399	2010	16.5	2.1	6.1	32.1	26.9	40.3
4 25	590	15.0	23.0	63	18.2	.757	2.1	.059	.961	2010	18.4	1.2	11.5	4.6	8.3	7.2
5 10	800	18.9	9.7	25	12.0	1.293	3.8	.039	.754	2000	26.0	18.0	4.9	2.5	4.1	2.2
6 25	590	15.0	23.0	63	18.2	.758	2.5	.053	.961	2010	18.8	2.3	14.9	5.5	8.9	7.2
7 90	390	2.6	87.9	225	45.9	.525	3.7	.068	.319	2090	19.8	.9	21.9	43.9	31.2	38.7
8 25	590	15.0	23.1	63	18.2	.756	2.1	.053	.960	2010	18.7	.9	11.4	4.6	8.9	7.3
9 CT	OFF	23.0	0.0	0	0.0	I	I	.003	I	2000	395.8	0.0	0.0	0.0	0.0	0.0
1 I	970	18.3	0.0	0	3.9	R	R	.093	R	600	23.1	32.9	9.3	.5	4.8	0.0
2 25	590	15.1	23.8	63	17.9	.759	1.7	.051	.958	1990	19.5	9.0	16.7	7.7	8.3	7.1
3 55	500	8.9	53.0	138	29.9	.564	2.7	.063	.393	2020	16.0	3.5	9.8	29.0	26.5	30.5
4 25	590	15.0	23.0	63	18.1	.755	2.4	.059	.960	2000	18.6	1.4	14.1	4.9	8.9	7.2
5 10	800	18.9	9.7	25	12.1	1.253	4.3	.038	.762	2000	26.0	9.1	8.5	2.7	4.2	2.2
6 25	590	15.0	23.9	63	17.9	.748	2.2	.053	.955	2000	18.8	1.9	18.2	4.5	8.3	7.2
7 90	390	2.6	87.9	225	45.9	.525	4.5	.067	.319	2090	19.9	.9	19.7	44.5	31.3	38.6
8 25	590	15.0	23.9	63	18.0	.742	3.0	.052	.957	2000	19.9	2.1	13.6	6.1	8.9	7.2
9 CT	OFF	23.0	0.0	0	0.0	I	I	.004	I	2000	328.2	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .2 R 9.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .2 R 9.7

TWO CYCLE COMPOSITE - HC- FID 0.35(.2) + 0.65(.2) = .216 G/KW HR (.161 GS)

CO- NDIR 0.35(7.9) + 0.65(6.9) = 6.952 G/KW HR (5.189 GS)

NOX-CL 0.35(1.9) + 0.65(9.7) = 9.529 G/KW HR (3.819 GS)

HC + NOX = 9.795 G/KW HR (3.525 GS)

SFC = .395 KG/KW HR (.649 BS)

ID = ECU SET.

TABLE E-58.MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 450-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-293 RUN-02 09-09-76 EFI-IR-HET-MFGR,53 WAI-14R HVA KS 1,069 HUM= 19,2 G/KG

MODE		CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED HC	G/HR CO	NOX	AT, FACT,	WEIGHTED HC-FID	G/HR CO	NOX-CL	CRN	VAC. MP
1	IDLE	600	.227	9.20	92	9,993	1592	11	75	2	.232	2,5	17	.4	0.0	967
2	25 PCT T	15	.181	11.60	225	11,783	8119	1	252	55	.077	.1	19	4,2	17,7	389
3	55 PCT T	5	.020	13.80	990	13,921	13972	1	90	152	.197	.1	6	22,3	39,3	229
4	25 PCT T	7	.197	11.90	205	12,098	8079	1	200	99	.077	.0	15	3,7	17,7	381
5	10 PCT T	190	.125	8.20	160	8,496	5398	13	169	37	.057	.8	9	2,1	7,2	967
6	25 PCT T	16	.216	11.60	210	11,817	8079	1	298	51	.077	.1	23	3,9	17,7	381
7	90 PCT T	9	.159	15.00	585	15,159	20729	1	938	283	.113	.1	50	31,9	64,1	66
8	25 PCT T	5	.136	11.60	250	11,737	8210	0	193	62	.077	.0	15	3,8	17,9	381
9	C,T,	6080	.020	.15	9	.779	0	0	0	0	.193	0,0	0	0,0	0,0	589
1	IDLE	799	.153	9.30	99	9,539	1588	13	51	3	.232	3,1	12	.6	0,0	967
2	25 PCT T	100	.251	11.50	230	11,762	8079	8	398	56	.077	.6	27	4,3	17,7	381
3	55 PCT T	33	.020	13.80	970	13,829	13200	4	39	159	.197	.5	6	23,3	39,2	226
4	25 PCT T	27	.125	12.10	180	12,228	8210	2	120	93	.077	.2	13	3,3	18,0	381
5	10 PCT T	186	.125	8.30	190	8,995	5993	13	163	93	.057	.7	9	2,5	7,2	965
6	25 PCT T	30	.193	11.50	220	11,696	8119	2	270	54	.077	.2	21	4,2	17,6	381
7	90 PCT T	16	.216	15.00	570	15,218	20725	2	595	275	.113	.3	67	31,1	65,0	63
8	25 PCT T	17	.136	11.60	210	11,738	8210	1	193	52	.077	.1	15	4,0	17,9	381
9	C,T,	5990	.010	.15	5	.705	0	0	0	0	.193	0,0	0	0,0	0,0	589

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL--------- HC	CO	NOX	FUEL	POWER
1	I	970	18,9	0,0	0	3,9	R	R	,099	R	600	22,9	48,0	11,2	,8	9,8	0,0
2	25	590	15,3	23,7	63	17,9	,755	2,3	,059	,959	1980	18,7	2,9	12,6	5,7	8,3	7,2
3	55	500	9,0	52,7	138	29,7	,569	2,9	,062	,393	2000	16,1	7,2	3,8	30,3	26,9	30,6
4	25	590	15,0	23,8	63	17,8	,749	2,1	,055	,955	1980	18,3	1,1	9,9	5,1	8,3	7,2
5	10	800	18,9	9,6	25	11,9	1,240	3,9	,038	,754	1980	26,0	20,9	6,0	2,8	9,1	2,2
6	25	590	15,0	23,8	63	17,8	,749	2,2	,059	,955	1980	18,6	2,6	19,8	5,3	8,3	7,2
7	90	390	2,6	86,0	226	95,7	,531	3,7	,048	,323	2000	19,7	1,9	32,0	93,5	31,3	38,3
8	25	590	15,0	29,0	63	18,1	,759	2,6	,053	,958	2000	18,8	,8	9,6	6,5	8,9	7,3
9	CT	OFF	23,0	0,0	0	0,0	I	I	,009	I	2000	247,2	0,0	0,0	0,0	0,0	0,0
1	I	970	18,2	0,0	0	3,5	R	R	,099	R	600	22,8	55,0	7,0	,8	9,9	0,0
2	25	590	15,0	23,8	63	17,8	,749	2,9	,053	,955	1980	18,7	10,3	15,8	5,9	8,3	7,2
3	55	500	8,9	52,5	139	29,1	,559	3,1	,062	,339	1990	16,1	9,2	3,9	31,9	25,9	30,3
4	25	590	15,0	29,1	63	18,1	,752	1,8	,055	,957	2000	18,0	2,7	7,7	9,5	8,5	7,3
5	10	800	18,3	9,7	25	12,0	1,292	9,6	,039	,756	1990	25,7	13,0	5,5	3,9	9,1	2,2
6	25	590	15,0	23,6	62	17,9	,757	2,3	,053	,960	2000	18,8	3,1	12,3	5,7	8,9	7,2
7	90	390	2,5	87,1	225	95,8	,526	3,2	,048	,320	2030	19,7	5,0	39,6	92,5	31,9	38,7
8	25	590	15,0	29,9	62	18,1	,756	2,2	,053	,960	2020	18,8	1,8	8,7	6,5	8,5	7,2
9	CT	OFF	23,0	0,0	0	0,0	I	I	,003	I	2000	295,6	0,0	0,0	0,0	0,0	0,0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- ,2 8 9,0

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- ,4 9 3,9

TWO CYCLE COMPOSITE - HC- FID 0,35(,2) + 0,65(,3) = ,267 G/KW HR (,199 G/BHP HR)

CO- NDIR 0,35(8,3) + 0,65(9,1) = 8,832 G/KW HR (6,586 G/BHP HR)

NOX-CL 0,35(9,0) + 0,65(3,9) = 3,938 G/KW HR (2,936 G/BHP HR)

HC + NOX = 9,209 G/KW HR (3,135 G/BHP HR)

SFC = ,395 KG/KW HR (,649 G/BHP HR)

ID = ECU SET.

TABLE E-59. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-2 TEST-293 RUN-03 09-09-76 EFI-IN-HEI-MEGH,53 WAI-168 AVA K= 1.052 HUM= 13.4 G/KG

MODE		CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE		552	.209	9.90	92	9.669	1588	10	68	3	.232	2.3	16	.6	0.0	465
2 25 PCT T		62	.222	11.90	215	11.628	8029	5	311	52	.077	.4	24	4.0	17.4	381
3 55 PCT T		16	.020	13.80	990	13.822	13972	2	40	150	.197	.3	4	22.0	39.4	224
4 25 PCT T		10	.109	11.70	280	11.805	8119	1	199	67	.077	.1	11	5.2	18.1	381
5 10 PCT T		150	.120	8.40	200	8.536	5993	10	155	45	.057	.6	9	2.5	7.3	467
6 25 PCT T		19	.170	11.60	270	11.771	8255	1	291	66	.077	.1	19	5.1	18.1	381
7 90 PCT T		12	.525	19.90	590	15.927	20775	2	1429	278	.113	.2	161	31.4	65.7	63
8 25 PCT T		9	.109	11.90	230	12.004	8210	0	193	55	.077	.0	11	4.2	18.1	381
9 C.T.		5760	.010	.15	4	.737	0	0	0	0	.193	0.0	0	0.0	0.0	597
1 IDLE		728	.125	9.30	51	9.505	1633	19	99	3	.232	3.2	10	.7	0.0	455
2 25 PCT T		104	.216	11.90	265	11.627	8119	8	309	65	.077	.6	23	5.0	18.0	381
3 55 PCT T		93	.015	13.80	950	13.820	13562	5	30	159	.197	.7	4	22.7	40.2	229
4 25 PCT T		32	.120	12.00	295	12.129	8119	2	162	57	.077	.2	13	4.4	18.1	381
5 10 PCT T		184	.125	8.30	180	8.445	5398	13	162	90	.057	.7	4	2.3	7.3	467
6 25 PCT T		23	.159	11.60	190	11.761	8165	2	222	46	.077	.1	17	3.5	18.1	381
7 90 PCT T		23	.590	19.70	530	15.292	20593	4	1422	250	.113	.4	166	28.3	66.4	63
8 25 PCT T		15	.120	11.60	280	11.722	8165	1	169	68	.077	.1	13	5.2	18.4	381
9 C.T.		5990	.216	.19	6	.952	0	0	0	0	.193	0.0	0	0.0	0.0	587

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	RSFC	RSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	970	18.3	0.0	0	3.5	R	R	.099	R	600	22.5	59.1	6.1	.8	9.9	0.0
2 25	590	15.0	29.0	63	17.8	.293	2.2	.053	.952	1990	18.9	9.5	9.3	5.1	8.3	7.2
3 55	500	8.9	53.1	139	29.7	.560	2.9	.062	.390	2000	16.1	6.7	2.3	29.3	24.3	30.3
4 25	590	15.0	29.2	64	17.9	.739	2.8	.059	.950	2000	18.7	1.5	9.3	6.9	8.3	7.2
5 10	800	18.9	9.8	24	12.0	1.229	4.7	.034	.348	2000	25.9	15.2	3.9	3.9	9.1	2.2
6 25	590	15.0	29.3	64	18.2	.298	2.8	.053	.955	2010	18.7	2.2	7.2	6.8	8.5	7.3
7 90	390	2.5	88.1	228	95.8	.520	3.2	.069	.316	2030	19.5	5.9	63.0	91.8	31.2	38.6
8 25	590	15.0	29.3	64	18.1	.296	2.3	.059	.959	2000	18.9	.6	9.3	5.6	8.9	7.3
9 CT	OFF	23.5	0.0	0	0.0	I	I	.009	I	2000	282.6	0.0	0.0	0.0	0.0	0.0
1 I	970	17.9	0.0	0	3.6	R	R	.099	R	620	22.9	52.5	3.9	1.0	5.0	0.0
2 25	590	15.0	29.2	63	17.9	.291	2.7	.053	.950	2000	18.9	10.3	9.1	6.9	8.3	7.2
3 55	500	8.8	53.9	139	29.9	.555	2.9	.062	.338	2030	16.1	11.6	1.7	31.9	26.5	30.9
4 25	590	15.0	29.3	64	17.9	.738	2.9	.055	.999	2000	18.2	3.1	9.9	6.1	8.3	7.2
5 10	800	18.9	9.7	26	11.9	1.223	4.2	.039	.749	1990	25.7	12.1	3.6	3.2	9.1	2.1
6 25	590	15.0	29.3	64	18.0	.291	2.8	.053	.951	2000	18.7	2.3	6.7	9.9	8.9	7.2
7 90	390	2.5	89.0	228	95.9	.510	2.9	.068	.310	2050	19.6	6.7	65.0	39.2	31.0	38.6
8 25	590	15.0	29.2	64	18.0	.290	2.8	.053	.999	2030	18.8	1.5	5.1	7.3	8.9	7.3
9 CT	OFF	23.1	0.0	0	0.0	I	I	.005	I	2000	218.6	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .2 16 9.0

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .3 19 3.8

TWO CYCLE COMPOSITE -

HC- FID 0.35(.2) + 0.65(.3) = .279 G/KW HR (.208 G/HP HR)

CO- NDIR 0.35(13.7) + 0.65(13.5) = 13.595 G/KW HR (10.138 G/HP HR)

NOX-CL 0.35(9.0) + 0.65(3.8) = 5.882 G/KW HR (2.895 G/HP HR)

HC + NOX = 9.161 G/KW HR (3.103 G/HP HR)

SFC = .389 KG/KW HR (.639 LB/HP HR)

ID = ECU SET.

TABLE E-60. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-2 TEST-244 RUN-01 09-14-76 EFT-TR-HEI 14B-NOAI EFFECT OF A/F AT WOT K= 1.096 HUM= 16.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	2224	6.960	10.30	300	17.518	25628	377	20568	146	377.3	20568	159.7	72.7	8
2	2000	1776	4.750	11.86	590	16.815	23814	290	13589	277	290.2	13589	304.0	71.2	8
3	2000	1552	3.360	12.93	950	16.469	22816	247	9403	437	247.1	9403	478.9	70.6	8
4	2000	1184	1.870	13.93	1482	15.336	21183	180	5021	654	180.4	5021	716.8	70.1	8
5	2000	96	.310	15.02	1959	15.341	20185	14	824	856	14.4	824	937.9	68.4	8
6	1990	1	.030	14.86	2103	14.890	19414	0	79	910	.1	79	997.7	65.8	8
7	2000	1	.020	14.08	1929	14.100	19232	0	55	874	.2	55	957.4	62.8	8
8	2000	1	.020	13.21	1253	13.230	18280	0	56	575	.2	56	630.0	57.6	8
9	2000	1	.020	12.38	600	12.400	17418	0	57	280	.2	57	306.7	50.1	8

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	470	.3	97.4	256	56.5	3.90	212.64	1.51	.580	12.0	.083	5.23	285.16	2.02	.353
2	350	.3	95.5	251	52.5	3.07	143.89	2.94	.550	12.8	.078	4.12	192.95	3.94	.334
3	295	.3	94.7	249	50.3	2.64	100.39	4.66	.531	13.2	.076	3.54	134.61	6.26	.323
4	250	.3	94.0	247	46.7	1.94	54.04	7.04	.497	13.8	.072	2.60	72.47	9.44	.302
5	205	.3	91.8	241	44.5	.16	9.09	9.44	.485	14.6	.069	.21	12.19	12.66	.295
6	180	.3	88.3	233	42.8	.00	.91	10.45	.485	15.0	.067	.00	1.22	14.01	.295
7	150	.3	84.2	221	42.4	.00	.66	10.52	.504	15.8	.063	.00	.89	14.11	.306
8	125	.3	77.2	203	40.3	.00	.73	7.[illegible]5	.522	16.8	.060	.00	.98	10.12	.318
9	105	.3	67.2	177	38.4	.00	.86	4.[illegible]2	.571	17.8	.056	.00	1.15	5.66	.347

ID = ECU SET

TABLE E-61. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HO ENGINE---PROJECT 11-9311

ENGINE-2 TEST-299 RUN-02 09-19-76 EFI-IR-HEI 1YR-NOAI-WEGR EFFECT OF A/F-HOT K= 1.046 HUM= 16.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	2176	6.960	10.19	180	17.402	29585	356	19862	89	356.2	19862	92.5	67.2	8
2	2000	1829	9.690	11.41	195	16.510	22906	291	13199	182	291.2	13199	199.9	67.3	8
3	2000	1600	3.900	12.38	620	15.963	22090	259	9509	285	253.7	9509	312.2	66.7	8
4	2000	1152	1.870	13.99	1052	15.992	20729	176	5055	967	176.0	5055	512.2	66.9	8
5	2000	120	.330	14.39	1396	14.739	19595	18	887	599	18.1	887	651.9	69.2	8
6	2000	35	.150	14.59	1998	14.499	19187	5	396	626	5.2	396	688.0	62.5	8
7	2000	6	.050	13.93	1960	13.961	18829	1	82	659	.9	82	716.3	60.3	8
8	2000	5	.020	13.07	1015	13.091	17589	1	59	951	.7	59	999.5	55.1	8
9	2000	3	.020	12.38	540	12.500	17010	0	55	255	.5	55	279.5	49.3	8

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTD	FF	BSHC	BSCO	BSNOX	BSFC	CALC A/F	CALC F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	910	.3	90.2	237	54.2	9.00	222.90	.95	.601	12.1	.083	5.36	298.91	1.27	.366
2	305	.3	90.2	237	50.5	3.27	197.51	2.09	.560	13.0	.077	4.38	197.81	2.79	.340
3	260	.3	89.5	235	48.7	2.87	107.57	3.22	.544	13.6	.074	3.85	149.26	4.32	.331
4	210	.3	89.0	239	45.7	2.01	57.71	5.39	.513	14.2	.070	2.70	77.39	7.16	.312
5	170	.3	86.1	224	43.2	.21	10.49	7.03	.502	15.1	.066	.29	14.06	9.43	.305
6	160	.3	83.8	220	42.3	.06	4.81	7.63	.505	15.2	.066	.08	6.45	10.23	.307
7	190	.3	80.8	212	41.5	.01	1.03	8.25	.519	15.9	.063	.02	1.38	11.07	.312
8	115	.3	73.9	196	38.6	.01	.75	6.29	.523	16.9	.059	.01	1.00	8.36	.318
9	100	.3	66.2	174	37.5	.01	.86	3.99	.547	17.8	.056	.01	1.15	5.28	.345

ID = ECU SET

TABLE E-62. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-299 RUN-03 09-19-76 EFI-TR-HEI NOAI-19R-MAXEGR.53XMI 90PCT K= 1.097 HUM= 16.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	1799	4.810	11.73	640	16.791	21682	260	12584	271	260.9	12584	297.1	63.9	21
2	2000	1509	3.900	12.79	610	16.363	20911	221	8777	259	221.0	8777	283.9	64.0	23
3	2000	1509	3.650	12.65	660	16.473	21001	221	9400	279	220.7	9400	306.9	64.1	36
4	2000	1280	2.590	13.35	880	16.037	20276	186	6987	369	185.6	6987	405.2	64.2	23
5	2000	1376	3.120	13.07	740	16.398	20638	200	7956	310	199.7	7956	340.2	64.2	23
6	2000	1972	3.550	12.79	650	16.509	21137	217	9181	276	216.9	9181	303.1	64.3	20
7	2000	1536	4.070	12.25	590	16.997	21682	232	10805	236	232.9	10805	258.5	64.3	20
8	2000	1616	4.520	11.99	460	16.796	21863	293	12052	199	293.3	12052	218.7	64.3	20
9	2000	1496	4.990	11.86	390	17.096	21999	253	13009	167	253.0	13009	183.3	64.3	18

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	520	2.8	85.8	225	97.8	3.08	198.85	3.28	.557	12.8	.078	4.13	199.61	4.30	.339
2	290	.9	85.8	225	96.1	2.61	103.82	3.06	.537	13.3	.075	3.51	139.22	4.11	.327
3	270	1.9	85.9	226	96.3	2.61	111.19	3.30	.539	13.2	.076	3.50	149.11	4.43	.328
4	200	.9	86.1	226	99.7	2.20	76.73	4.37	.519	13.7	.073	2.99	102.90	5.86	.316
5	210	.9	86.1	226	95.5	2.34	99.11	3.67	.528	13.3	.075	3.17	126.21	4.92	.321
6	220	.8	86.2	226	96.6	2.57	108.60	3.27	.540	13.2	.076	3.49	145.69	4.38	.329
7	230	.8	86.2	226	97.8	2.75	127.81	2.79	.559	13.1	.076	3.69	171.90	3.79	.337
8	290	.9	86.3	227	98.2	2.88	142.56	2.36	.559	12.9	.078	3.86	191.18	3.16	.340
9	250	.7	86.3	227	98.5	2.99	153.88	1.98	.562	12.6	.079	4.01	206.35	2.65	.342

ID = ECU SET

TABLE E-63. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-C1D HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-299 RUN-04 09-19-76 EFI-TR-HEI NOAI-19,16,18,20B-MAXEGR.53 90 K= 1.097 HUM= 16.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	1568	3.210	12.52	640	15.910	20820	235	8485	278	235.1	8485	305.0	64.2	25
2	2000	1680	3.550	12.38	625	16.123	20502	245	9119	269	245.1	9119	289.9	64.2	33
3	2000	1792	3.810	12.12	620	16.136	20276	258	9671	259	258.9	9671	283.7	64.3	38
4	2000	1920	4.120	11.99	605	16.331	20321	275	10356	250	274.5	10356	274.2	64.3	41

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	230	1.0	86.1	226	95.9	2.78	100.37	3.29	.533	13.7	.073	3.73	139.60	4.41	.329
2	240	1.3	86.1	226	95.2	2.90	107.87	3.12	.525	13.5	.074	3.89	144.65	4.19	.319
3	245	1.5	86.2	226	99.7	3.06	119.39	3.06	.518	13.4	.075	4.10	153.91	4.10	.315
4	250	1.6	86.3	227	99.8	3.25	122.50	2.96	.519	13.2	.076	4.35	164.27	3.96	.316

ID = ECU SET

TABLE E-64. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-299 RUN-05 09-19-76 EFI-IR-HEI NOAI-19R-EFFECT OF A/F 55PCT K= 1.082 HUM= 15.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-LL	CKW	VAC. MM
1	2000	1424	2.690	12.91	930	15.983	13339	196	5235	247	196.9	5235	267.9	39.5	269
2	2000	1136	1.990	13.49	1088	15.710	13925	115	3979	320	115.2	3979	396.5	39.5	262
3	2000	629	1.070	14.34	1265	15.531	13562	62	1887	367	62.3	1887	396.8	39.5	262
4	2000	120	.030	14.86	1437	14.909	13926	12	55	430	12.3	55	465.1	39.5	251
5	2000	7	.010	14.08	1516	14.091	13336	1	19	476	.7	19	515.9	39.5	226
6	2000	7	.010	13.07	1016	13.981	13381	1	21	345	.8	21	373.9	39.6	188
7	2000	5	.010	12.38	600	12.191	13925	1	23	229	.6	23	292.2	39.6	150
8	2000	6	.010	11.73	350	11.741	19560	1	25	199	.8	25	155.9	39.7	99

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CID	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	1000	10.9	52.9	139	31.6	2.83	101.09	9.77	.597	13.7	.073	3.79	135.56	6.90	.363
2	830	10.3	53.0	139	30.7	2.22	67.07	6.18	.580	14.0	.071	2.98	89.99	8.29	.353
3	720	10.3	53.0	139	29.9	1.20	36.99	7.08	.569	14.3	.070	1.61	98.87	9.50	.393
4	625	9.9	53.0	139	29.6	.24	1.05	8.30	.558	15.0	.067	.32	1.41	11.13	.390
5	460	8.9	53.0	139	29.9	.01	.37	9.20	.555	15.8	.063	.02	.50	12.33	.337
6	360	7.9	53.1	139	29.5	.02	.90	6.66	.556	16.9	.059	.02	.59	8.93	.338
7	280	5.9	53.1	139	30.7	.01	.44	9.32	.578	17.8	.056	.02	.59	5.80	.351
8	150	3.7	53.2	139	32.1	.02	.48	2.78	.603	18.8	.053	.02	.65	3.73	.367

ID = ECU SET

TABLE E-65. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-299 RUN-06 09-19-76 EFI-TP-HEI NOAI-19R-EFFECT OF A/F 25PCT K= 1.082 HUM= 15.5 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-LL	CKW	VAC. MM
1	2000	90	.180	14.86	620	15.095	8936	3	214	122	2.7	216	132.3	18.0	396
2	2000	7	.020	14.23	435	14.251	8469	0	25	128	.5	25	138.7	18.0	396
3	2000	7	.010	13.35	500	13.361	8845	1	13	110	.5	13	118.9	18.0	373
4	2000	5	.010	12.12	230	12.131	9389	0	16	59	.4	16	69.0	18.1	333
5	2000	9	.010	10.88	100	10.890	11299	0	21	39	.5	21	37.1	19.1	239

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CID	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	1000	15.6	29.2	63	19.7	.11	9.15	5.18	.815	19.8	.067	.15	12.27	6.99	.496
2	850	15.6	29.2	64	19.1	.02	1.09	5.93	.790	15.4	.069	.03	1.90	7.28	.490
3	600	14.7	29.2	64	19.5	.02	.57	8.45	.806	16.6	.060	.03	.76	6.29	.490
4	400	13.1	29.2	64	20.7	.02	.46	2.50	.855	18.2	.055	.02	.89	3.36	.520
5	250	9.2	29.2	64	29.8	.02	.88	1.95	1.024	20.2	.050	.03	1.19	1.95	.623

ID = ECU SET

TABLE E-66. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-299 RUN-07 09-19-76 EFI-TR-HEI NOAI-198-EFFECT OF A/F 10PCT K= 1.101 HUM= 17.9 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	2	.010	13.69	298	13.650	7031	0	10	92	.1	10	96.7	7.2	952
2	2000	1	.010	13.35	273	13.360	6985	0	11	39	.1	11	92.6	7.2	947
3	2000	1	.001	13.07	188	13.071	7031	0	1	39	.1	1	37.0	7.2	992
4	2000	1	.001	12.65	163	12.651	7031	0	1	28	.1	1	31.1	7.2	937
5	2000	1	.001	12.38	145	12.381	7439	0	1	29	.1	1	31.9	7.2	919
6	2000	1	.001	11.85	98	11.851	7399	0	1	20	.1	1	22.9	7.2	909
7	2000	1	.001	11.29	73	11.291	8029	0	1	17	.1	1	19.1	7.2	378
8	2000	2	.001	10.76	55	10.761	8845	0	2	15	.2	2	16.5	7.2	330
9	2000	3	.001	9.86	27	9.861	11748	0	2	11	.4	2	11.8	7.2	165

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1	1000	17.8	9.6	25	15.5	.01	1.09	9.95	1.613	16.3	.061	.02	1.97	5.97	.981
2	900	17.4	9.6	25	15.9	.01	1.11	9.07	1.603	16.6	.060	.01	1.99	5.95	.975
3	800	17.9	9.6	25	15.5	.01	.11	3.53	1.610	17.0	.059	.01	.15	9.73	.979
4	700	17.2	9.6	25	15.5	.01	.12	2.97	1.610	17.5	.057	.01	.16	3.98	.979
5	600	16.5	9.6	25	16.9	.01	.13	3.09	1.702	17.9	.056	.01	.17	9.07	1.035
6	500	16.1	9.6	25	16.3	.01	.13	2.13	1.690	18.6	.059	.01	.18	2.86	1.028
7	400	14.9	9.7	25	17.7	.01	.15	1.82	1.839	19.6	.051	.01	.20	2.99	1.115
8	300	13.0	9.7	25	19.5	.02	.17	1.58	2.018	20.9	.049	.03	.23	2.11	1.228
9	200	6.5	9.7	25	25.9	.04	.25	1.12	2.678	22.2	.045	.05	.34	1.50	1.629

ID = ECU SET

TABLE E-67. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-299 RUN-08 09-15-76 EFI-TR-HEI NOAI-298-MAXEGR.53 SSPCT K= 1.105 HUM= 17.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	1399	6.270	10.76	125	17.186	15699	192	11566	38	192.1	11566	91.9	39.2	180
2	2000	1890	5.180	11.61	155	17.003	14928	186	9156	95	186.0	9156	99.7	39.3	190
3	2000	1600	3.310	12.93	290	16.924	14107	158	5793	68	158.1	5793	75.6	39.3	183
4	2000	1312	1.870	13.78	375	15.800	13972	128	3221	106	128.1	3221	117.3	39.3	183
5	2000	69	.010	14.86	570	14.878	13018	7	18	166	6.9	18	182.9	39.3	165
6	2000	15	.020	14.08	650	14.102	13109	2	38	201	1.6	38	221.6	39.3	145
7	2000	11	.010	13.07	900	13.081	13200	1	20	139	1.2	20	148.0	39.4	119
8	2000	8	.020	12.38	330	12.401	13562	1	44	120	1.0	44	132.4	39.4	91
9	2000	7	.020	11.73	200	11.751	13971	1	48	79	.9	48	87.2	39.4	63

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	CALC F/A	G/KW HR HC	G/KW HR CO	G/KW HR NOX	SFC KG/KW HR
1	600	7.1	52.6	138	39.6	2.74	223.33	.73	.658	12.3	.081	3.68	299.99	.98	.900
2	500	7.1	52.7	138	32.8	3.59	176.79	.87	.623	12.6	.079	4.82	237.08	1.17	.379
3	400	7.2	52.7	138	31.1	3.05	110.89	1.32	.591	13.3	.075	4.09	148.70	1.77	.359
4	335	7.2	52.7	138	29.7	2.47	62.19	2.05	.563	13.9	.072	3.32	83.40	2.75	.343
5	225	6.5	52.8	139	28.7	.13	.39	3.20	.544	15.0	.067	.18	.96	4.29	.331
6	200	5.7	52.8	139	28.9	.03	.73	3.87	.548	15.8	.063	.04	.97	5.19	.333
7	150	4.7	52.8	139	29.1	.02	.39	2.59	.551	16.9	.059	.03	.53	3.47	.335
8	100	3.6	52.8	139	29.9	.02	.85	2.31	.566	17.8	.056	.03	1.14	3.10	.344
9	70	2.5	52.9	139	30.8	.02	.93	1.52	.583	18.8	.053	.02	1.24	2.04	.354

ID = ECU SET

TABLE E-68. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-299 RUN-09 09-15-76 EFI-TR-HEI NOAI-30B-MAXEGR,S3 2SPCT K= 1.105 HUM= 17.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	2784	6.800	10.19	50	17.312	10523	196	8350	10	195.8	8350	11.1	17.9	323
2	2000	1990	2.990	11.36	68	14.963	9939	112	9079	16	112.0	9079	17.1	17.9	317
3	2000	1760	3.310	12.65	78	14.162	9349	117	3866	15	116.8	3866	16.5	17.9	317
4	2000	1536	1.870	13.69	98	15.686	9026	101	2174	19	101.1	2174	20.7	17.9	310
5	2000	100	.110	14.39	123	14.511	8800	7	135	25	6.9	135	27.4	17.9	290
6	2000	30	.080	12.52	83	12.603	8981	2	115	20	2.9	115	21.7	18.0	296
7	2000	1920	.510	9.69	55	10.360	10115	205	1006	18	205.1	1006	19.7	18.0	160

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOx	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOx	SFC KG/KW HR
1	520	12.7	29.0	63	23.2	8.29	353.69	.93	.967	12.1	.082	11.12	474.29	.57	.588
2	900	12.5	29.0	63	21.9	4.74	172.76	.66	.912	15.0	.067	6.36	231.68	.88	.555
3	320	12.5	29.0	63	20.6	4.95	163.73	.63	.858	13.5	.074	6.63	219.56	.85	.522
4	270	12.2	29.0	63	19.9	4.28	92.07	.79	.828	14.0	.071	5.74	123.47	1.06	.504
5	210	11.9	29.1	63	19.9	.29	5.71	1.05	.807	15.9	.065	.39	7.65	1.41	.491
6	150	9.7	29.1	63	19.8	.10	4.88	.83	.822	17.5	.057	.14	6.54	1.12	.500
7	100	6.3	29.1	63	22.3	8.69	42.60	.76	.926	21.0	.048	11.65	57.13	1.01	.563

ID = ECU SET

TABLE E-69. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-295 RUN-01R 09-20-76 EFI-TR-HEI NOAI-MAXEGR.53-335TO305ECU SS K= 1.096 HUM= 16.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	1399	1.870	13.99	990	15.513	13880	137	3380	131	137.3	3380	193.2	39.7	157
2	2000	1408	1.870	13.99	510	15.521	13608	141	3312	198	141.0	3312	162.7	39.7	165
3	2010	1490	1.870	13.99	580	15.529	13608	199	3311	169	199.2	3311	189.9	39.9	168
4	2000	1472	1.870	13.99	690	15.528	13926	195	3266	189	195.9	3266	201.3	39.8	170
5	2010	1536	1.870	13.99	670	15.535	13336	151	3293	191	150.6	3293	209.2	90.0	175
6	2010	1536	1.830	13.99	700	15.995	13109	199	3127	197	198.9	3127	215.9	90.0	180
7	2010	1568	1.830	13.99	760	15.999	13200	152	3198	215	152.5	3198	235.9	90.0	180

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	20	6.2	53.2	190	30.6	2.65	65.26	2.52	.575	14.2	.071	3.56	87.51	3.38	.350
2	22	6.5	53.2	190	30.0	2.72	63.95	2.87	.569	14.2	.071	3.65	85.75	3.84	.343
3	24	6.6	53.5	190	30.0	2.77	63.61	3.24	.560	14.2	.071	3.71	85.31	4.35	.341
4	26	6.7	53.3	190	29.6	2.81	63.06	3.55	.555	14.2	.071	3.76	84.57	4.76	.338
5	28	6.9	53.6	190	29.9	2.89	62.30	3.67	.599	14.2	.071	3.88	83.59	4.92	.339
6	30	7.1	53.6	190	28.9	2.85	60.08	3.78	.539	14.2	.070	3.82	80.57	5.07	.328
7	32	7.1	53.6	190	29.1	2.93	60.98	4.13	.592	14.2	.070	3.93	81.11	5.59	.330

ID = IGN BTDC

TABLE E-70. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-295 RUN-02R 09-20-76 EFI-TR-HEI NOAI-MAXEGR.53-265TO25SECU SS K= 1.096 HUM= 16.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2000	5	.197	14.59	570	14.688	13880	1	282	179	.5	282	195.9	39.8	135
2	2000	9	.216	14.59	590	14.756	13972	0	398	179	.9	398	195.9	39.8	147
3	2000	9	.275	14.39	650	14.666	13290	0	509	196	.9	509	219.3	39.8	150
4	2000	9	.275	14.39	740	14.666	12882	0	488	216	.9	488	236.5	39.8	155
5	2000	9	.312	14.23	850	14.542	12655	0	598	296	.9	598	269.1	39.9	160

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	18	5.3	53.9	190	30.6	.01	5.99	3.95	.573	15.2	.066	.01	7.29	4.63	.399
2	20	5.8	53.9	190	29.7	.01	7.68	3.95	.556	15.1	.066	.01	10.30	4.63	.338
3	22	5.9	53.9	190	29.3	.01	9.73	3.78	.548	15.2	.066	.01	13.09	5.06	.334
4	24	6.1	53.9	190	28.9	.01	9.93	4.17	.532	15.2	.066	.01	12.69	5.59	.323
5	26	6.3	53.5	190	27.9	.01	10.59	4.79	.522	15.3	.065	.01	14.20	6.36	.317

ID = IGN BTDC

TABLE E-71. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-295 RUN-03R 09-20-76 EFI-IR-HEI NOAI-MAXEGR.S3-150T017SECU 55 K= 1.100 HUM= 17.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1	2000	1	.025	12.79	500	12.815	13789	0	55	179	.1	55	196.9	39.9	112
2	2000	1	.025	12.79	460	12.815	13290	0	53	158	.1	53	179.2	39.9	112
3	2000	1	.030	12.65	560	12.680	13018	0	63	191	.1	63	209.9	39.9	117
4	2000	1	.090	12.65	620	12.691	12796	0	82	207	.1	82	227.9	39.9	119
5	2000	1	.051	12.79	680	12.841	12383	0	99	218	.1	99	239.9	90.0	127
6	2000	1	.072	12.79	880	12.862	12292	0	139	279	.1	139	307.1	90.0	130
7	2000	1	.082	12.79	850	12.872	12020	0	155	269	.1	155	289.8	90.0	137

MODE	ID	UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE MV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	CALC A/F	CALC F/A	G/KW HR HC	CO	NOX	SFC KG/KW HR
1	20	4.4	53.5	191	30.4	.00	1.06	3.95	.568	17.3	.058	.00	1.92	4.62	.396
2	22	4.4	53.5	191	29.3	.00	1.02	3.06	.598	17.3	.058	.00	1.37	4.10	.333
3	24	4.6	53.6	191	28.7	.00	1.21	3.69	.536	17.5	.057	.00	1.63	4.99	.326
4	26	4.7	53.6	191	28.1	.00	1.59	3.99	.525	17.4	.057	.00	2.13	5.35	.319
5	28	5.0	53.6	191	27.3	.00	1.91	4.20	.509	17.2	.058	.00	2.57	5.69	.310
6	30	5.1	53.6	191	27.1	.00	2.68	5.39	.506	17.2	.058	.00	3.59	7.23	.308
7	32	5.4	53.6	191	26.5	.00	3.00	5.09	.494	17.2	.058	.00	4.02	6.82	.301

ID = IGN BTDC

APPENDIX F

SYSTEM ASSEMBI Y FOR SERVICE ACCUMULATION DEMONSTRATION

F-1 Summary of the Results
F-2 through F-25 Computer Printouts

TABLE F-1. SYSTEM ASSEMBLY FOR SERVICE ACCUMULATION DEMONSTRATION

Test No.	Run No.	Type Test	Description	Gram/kW Hr HC	CO	NO_x	HC+NO_x	Kg/ kW Hr SFC	Appendix Table
252	1	9-EPA	EFI-TR-HEI WAIXM519-WVA16B-375ECU-	0.356	14.141	3.387	3.744	.420	F-2
	2		FGRMBP	0.310	13.335	3.372	3.682	.417	F-3
253	1	23-Mode	EFI-TR-HEI WAI-WVA16B-EGR 13 to 18	0.435	22.700	6.759	7.194	.386	F-4
254	1	23-Mode	EFI-TR-HEI WVA16B-WAIM7-275 ECU-EGR6010	0.356	11.122	4.077	4.434	.414	F-5
260	1	9-EPA	EFI-TR-EGR-HEI WAI-16BWVA-Auto Sys	0.334	14.481	4.788	5.121	.396	F-6
	2		XMEGRM3	0.292	13.721	5.503	5.795	.391	F-7
261	1	9-EPA	EFI-TR-EGR-HEI 16BWVA-WAI-275 ECU Auto Sys	0.330	14.698	4.382	4.712	.391	F-8
	3		Same as Run 01	0.294	14.584	4.082	4.377	.388	F-9
	WOT		Same as Run 01						F-10
262	1	9-EPA	EFI-TR-EGR-HEI 16BWVA-WAI-275 ECU Auto Sys	0.353	12.575	4.806	5.160	.389	F-11
	2		Same as Run 01	0.398	11.740	4.530	4.928	.387	F-12
	3		Same as Run 01	0.348	12.217	4.325	4.674	.392	F-13
	WOT		Same as Run 01						F-14
263	1	9-EPA	EFI-TR-EGR-HEI 16BWVA-WAI-275ECU Auto Sys	0.333	12.034	4.767	5.100	.394	F-15
	2		Same as Run 01	0.352	10.817	4.598	4.949	.391	F-16
	1EGR		Sample of Recirculated Exhaust	4.754	35.011	5.968	10.722	.398	F-17
	2EGR		Sample of Recirculated Exhaust	4.858	36.833	5.702	10.559	.385	F-18
	4		Sampled from Side with AI Disconnected	2.213	62.234	5.101	7.314	.385	F-19
	WOT		EFI-TR-EGR-HEI 16B-WAI-275 ECU Auto Sys						F-20
264	1	23-Mode	EFI-TR-AEGR-HEI 16BWVA-WAI-275 ECU	0.319	5.589	6.559	6.878	.395	F-21
	2		EFI-TR-AEGR-HEI 16BWVA-WAI-275 ECU	0.297	6.231	6.771	7.068	.391	F-22
265	1	9-EPA	EFI-TR-EGR-HEI 16BWVA-WAI-275 ECU Auto Sys	0.404	9.200	4.310	4.715	.398	F-23
	2		EFI-TR-EGR-HEI 16BWVA-WAI-275 ECU Auto Sys	0.365	10.797	4.337	4.703	.399	F-24
	EGR		Sample of Recirculated Exhaust	5.086	36.417	5.312	10.397	.401	F-25

TABLE F-2. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-252 RUN-01 09-28-76 EFI-IR-HEI WAIXMS+9-HVA168-37SECU-FGHMHP K= 1.003 HUM= 10.8 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	INTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	656	.115	8.81	33	8.996	1769	19	95	2	.232	3.2	11	.5	0.0	457
2 25 PCT T	77	.337	11.73	85	12.076	9208	7	519	22	.077	.5	40	1.7	17.7	353
3 55 PCT T	13	.093	12.74	545	12.884	13381	2	195	206	.147	.2	29	30.2	39.2	226
4 25 PCT T	12	.109	12.25	90	12.355	8981	1	152	22	.077	.1	12	1.7	17.5	353
5 10 PCT T	17	.061	11.12	138	11.183	5670	1	63	23	.057	.1	4	1.3	7.1	439
6 25 PCT T	10	.115	12.12	85	12.236	9072	1	171	21	.077	.1	13	1.6	17.6	353
7 90 PCT T	12	.455	14.54	520	14.992	21228	2	1302	245	.113	.2	147	27.7	63.4	74
8 25 PCT T	3	.040	12.52	98	12.561	9117	0	54	24	.077	.0	5	1.8	17.7	353
9 C.T.	7200	.010	.15	3	.881	0	0	0	0	.143	0.0	0	0.0	0.0	582
1 IDLE	880	.098	8.92	30	8.613	1769	19	91	2	.232	4.5	9	.5	0.0	457
2 25 PCT T	86	.337	11.73	85	12.077	9299	7	524	22	.077	.6	40	1.7	17.7	356
3 55 PCT T	70	.061	12.74	510	12.859	13200	8	127	174	.147	1.2	19	25.6	38.4	226
4 25 PCT T	50	.072	12.52	83	12.597	8890	4	102	19	.077	.3	8	1.5	17.6	353
5 10 PCT T	96	.061	11.24	185	11.306	5715	3	63	31	.057	.1	4	1.8	7.2	437
6 25 PCT T	35	.088	12.25	99	12.391	9253	3	133	22	.077	.2	10	1.7	17.7	353
7 90 PCT T	92	.590	14.54	51	15.089	21092	7	1529	237	.113	.8	172	26.8	63.6	74
8 25 PCT T	24	.030	12.52	93	12.553	9026	2	44	22	.077	.1	3	1.7	17.8	353
9 C.T.	7200	.020	.15	3	.891	0	0	0	0	.143	0.0	0	0.0	0.0	582

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CIQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 I		18.0	0.0	0	3.9	R	R	.091	R	600	24.2	73.7	9.1	.8	5.2	0.0
2 25		13.9	23.7	62	20.3	.855	.9	.055	.520	2000	18.2	11.9	15.9	2.5	9.0	7.3
3 55		8.9	52.6	137	29.5	.561	3.9	.058	.391	2020	17.2	5.1	11.1	95.9	29.9	30.7
4 25		13.9	23.5	62	19.8	.893	.9	.056	.513	1980	17.9	1.7	9.5	2.5	8.8	7.2
5 10		17.1	9.6	25	12.5	1.305	2.9	.051	.799	2000	19.7	1.2	1.9	2.0	9.1	2.2
6 25		13.9	23.6	62	20.0	.896	.9	.055	.515	1990	18.0	1.9	5.1	2.9	8.8	7.2
7 90		2.9	85.1	223	96.8	.550	2.9	.067	.335	2000	14.8	5.0	56.7	91.6	30.9	38.2
8 25		13.9	23.8	62	20.1	.895	1.0	.057	.519	2000	17.6	.9	1.8	2.7	8.9	7.3
9 CT		22.9	0.0	0	0.0	I	I	.009	I	2000	236.0	0.0	0.0	0.0	0.0	0.0
1 I		18.0	0.0	0	3.9	R	R	.090	R	600	25.2	57.6	3.6	.8	5.2	0.0
2 25		14.0	23.8	62	20.5	.861	.9	.055	.529	2000	18.2	7.2	15.2	2.7	9.1	7.3
3 55		8.9	52.2	137	29.1	.558	3.9	.058	.339	2000	17.2	15.1	7.0	91.8	29.7	30.5
4 25		13.9	23.7	62	19.6	.828	.8	.057	.509	1990	17.6	3.9	3.0	2.9	8.7	7.2
5 10		17.2	9.6	25	12.6	1.308	3.3	.051	.795	2010	19.5	1.9	1.3	2.9	9.1	2.2
6 25		13.9	23.8	62	20.9	.858	1.0	.056	.522	2000	17.9	2.9	3.8	2.6	9.1	7.3
7 90		2.9	85.3	224	96.5	.595	2.8	.068	.332	2000	14.8	9.6	64.8	93.7	30.3	38.3
8 25		13.9	23.8	63	19.9	.835	.9	.057	.508	2000	17.6	1.9	1.3	2.8	8.8	7.3
9 CT		22.9	0.0	0	0.0	I	I	.009	I	2000	233.3	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .2 14 3.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 14 3.3

TWO CYCLE COMPOSITE -

HC- FID	0.35(.2) + 0.65(.9) =	.356	G/KW HR	(.266 BS)
CO- NDIR	0.35(13.9) + 0.65(14.3) =	14.191	G/KW HR	(10.595 BS)
NOX-CL	0.35(3.6) + 0.65(3.3) =	3.387	G/KW HR	(2.526 BS)
	HC + NOX =	3.744	G/KW HR	(2.792 BS)
	SFC =	.920	KG/KW HR	(.690 BS)

ID =

TABLE F-3. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-252 RUN-02 09-28-76 EFI-TR-HEI SAME AS RUN 1 K= .989 HUM= 10.0 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	G/KW	VAC. MM
1 IDLE	560	.120	9.01	33	9.191	1729	11	95	2	.232	2.6	11	.5	0.0	957
2 25 PCT T	60	.300	11.73	80	12.036	9389	5	972	20	.077	.9	36	1.6	18.0	353
3 55 PCT T	19	.109	12.52	605	12.625	13336	2	221	209	.197	.2	33	30.7	39.1	226
4 25 PCT T	10	.093	12.25	93	12.399	9208	1	190	23	.077	.1	11	1.7	17.7	353
5 10 PCT T	12	.056	11.36	193	11.917	5806	1	58	32	.057	.0	3	1.6	7.3	937
6 25 PCT T	8	.098	12.38	83	12.479	9026	1	199	20	.077	.0	11	1.5	17.7	353
7 90 PCT T	9	.356	14.70	550	15.057	20729	1	991	247	.113	.2	112	27.9	63.2	79
8 25 PCT T	9	.090	12.79	93	12.831	9117	0	58	22	.077	.0	9	1.7	17.8	353
9 C.T.	6880	.030	.15	3	.869	0	0	0	0	.193	0.0	0	0.0	0.0	582
1 IDLE	720	.109	8.62	30	8.802	1769	14	92	2	.232	3.6	10	.5	0.0	957
2 25 PCT T	139	.350	11.73	78	12.095	9117	11	533	19	.077	.9	91	1.5	17.7	353
3 55 PCT T	65	.072	13.07	560	13.199	13926	7	198	187	.197	1.1	22	27.9	39.3	226
4 25 PCT T	98	.077	12.52	85	12.602	8890	9	110	20	.077	.3	8	1.5	17.2	356
5 10 PCT T	95	.072	11.29	160	11.317	5625	2	72	26	.057	.1	9	1.5	7.1	937
6 25 PCT T	30	.093	12.52	75	12.616	8800	2	131	17	.077	.2	10	1.3	17.6	353
7 90 PCT T	39	.525	14.86	500	15.389	20911	5	1992	222	.113	.6	163	25.1	63.7	79
8 25 PCT T	22	.090	12.79	83	12.833	8618	2	95	18	.077	.1	9	1.9	17.0	356
9 C.T.	6900	.090	.15	3	.832	0	0	0	0	.193	0.0	0	0.0	0.0	582

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ %	FC	RSFC	BSNOX	F/A	SFC KG/KW HR	PPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I		18.0	0.0	0	3.8	R	R	.092	R	600	23.7	73.0	9.8	.7	5.1	0.0
2 25		13.9	29.1	62	20.7	.858	.9	.055	.522	2030	18.3	11.1	16.5	2.3	9.2	7.9
3 55		8.9	52.9	137	29.9	.561	9.0	.057	.391	2010	17.5	6.7	19.7	95.5	29.9	30.6
4 25		13.9	23.8	62	20.3	.859	1.0	.056	.519	2000	17.9	1.8	9.9	2.6	9.0	7.3
5 10		17.2	9.7	25	12.8	1.315	3.3	.052	.800	2030	19.3	1.1	1.5	2.7	9.2	2.2
6 25		13.9	23.7	62	19.9	.890	.8	.056	.511	1990	17.7	1.9	5.0	2.2	8.8	7.2
7 90		2.9	89.8	229	95.7	.539	2.9	.068	.328	1990	19.8	9.9	50.7	91.5	29.8	38.1
8 25		13.9	23.8	63	20.1	.849	.9	.058	.513	2000	17.3	.7	2.0	2.5	8.9	7.3
9 CT		22.9	0.0	0	0.0	I	I	.009	I	2000	239.2	0.0	0.0	0.0	0.0	0.0
1 I		18.0	0.0	0	3.9	R	R	.091	R	600	29.7	52.9	3.7	.8	5.3	0.0
2 25		13.9	23.7	62	20.1	.849	.8	.055	.516	1990	18.2	12.5	15.6	2.5	9.0	7.3
3 55		8.9	52.7	137	29.6	.561	3.6	.059	.391	2020	16.9	15.8	8.3	95.6	25.3	30.9
4 25		19.0	23.0	60	19.6	.851	.9	.057	.518	2000	17.5	9.2	3.2	2.5	8.8	7.1
5 10		17.2	9.6	25	12.9	1.297	2.7	.051	.789	1990	19.9	2.0	1.6	2.5	9.1	2.2
6 25		13.9	23.6	63	19.9	.823	.7	.057	.500	1980	17.5	2.6	3.8	2.2	8.7	7.2
7 90		2.9	85.9	229	96.1	.590	2.6	.069	.328	2000	19.5	8.6	62.1	91.7	30.3	38.9
8 25		19.0	22.8	61	19.0	.833	.8	.058	.506	1980	17.3	1.8	1.6	2.3	8.5	7.0
9 CT		22.9	0.0	0	0.0	I	I	.009	I	2000	250.2	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .2 12 3.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 19 3.2

TWO CYCLE COMPOSITE -

HC- FID 0.35(.2) + 0.65(.9) = .310 G/KW HR (.231 BS)

CO- NDIR 0.35(11.9) + 0.65(19.1) = 13.335 G/KW HR (9.999 BS)

NOx-CL 0.35(3.6) + 0.65(3.2) = 3.372 G/KW HR (2.529 BS)

HC + NOX = 3.682 G/KW HR (2.796 BS)

SFC = .917 KG/KW HR (.686 BS)

ID =

TABLE F-4. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-2 TEST-253 RUN-1 EFI-TR-MEI MAI-MVA168-EGR13T018

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	444	1.5	25.6	742	.082	8.33	28
2	1200	6.8	1	399	4.3	19.3	2+	.020	11.36	54
3	1200	24.4	3	439	3.2	20.4	264	.193	10.52	48
4	1200	56.9	7	417	4.2	25.3	427	.109	8.42	125
5	1200	81.3	10	386	4.8	23.8	360	.104	9.01	390
6	1200	160.0	20	287	6.4	20.9	439	.115	10.30	1680
7	1200	238.6	30	152	8.8	18.8	69	.115	11.61	1869
8	1200	260.3	33	117	10.3	16.8	6	.030	13.21	1183
9	1200	292.9	37	56	13.3	14.3	47	1.262	14.23	300
10	1200	318.6	40	3	14.8	14.1	112	2.020	13.64	230
11	600	0.0	0	447	1.6	25.3	504	.068	8.42	29
12	1200	0.0	0	551	0.0	1174.8	881	.010	.08	2
13	2300	344.4	83	10	27.6	14.4	20+	1.480	13.64	500
14	2300	317.3	76	48	25.1	14.6	114	1.262	13.93	440
15	2300	284.7	69	91	22.6	15.4	34	.051	14.39	760
16	2300	257.6	62	119	20.2	16.4	21	.015	13.49	480
17	2300	170.8	41	249	14.9	17.3	18	.040	12.79	680
18	2300	84.8	21	356	10.6	17.8	14	.040	12.38	178
19	2300	62.4	15	399	8.0	18.7	12	.040	11.73	620
20	2300	27.1	7	432	6.5	19.9	12	.040	11.00	175
21	2300	8.1	2	414	7.3	19.6	8	.010	11.24	80
22	600	0.0	0	434	1.7	18.2	311	.187	11.86	42
23	2300	0.0	0	579	0.0	1357.5	1040	.010	.04	3

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	13.5	30	1.7	.070	0	3.4	R	R	R
2	.9	15	6.7	.060	5	4.4	1.07	17.9	7.9
3	7.9	117	4.8	.060	18	7.1	2.58	38.0	1.6
4	20.8	107	20.2	.050	42	9.2	2.91	15.0	2.8
5	18.7	109	67.4	.030	60	10.5	1.83	10.7	6.6
6	27.0	142	343.5	.060	118	14.2	1.34	7.1	17.1
7	5.2	174	467.8	0.000	176	19.5	.17	5.8	15.6
8	.4	48	305.4	.040	192	22.7	.01	1.5	9.3
9	4.0	2186	85.4	0.000	216	29.3	.11	59.4	2.3
10	10.6	3862	72.3	0.000	235	32.7	.27	96.5	1.8
11	11.5	34	1.8	.070	0	3.6	R	R	R
12	0.0	0	0.0	.120	0	0.0	I	I	I
13	36.9	6101	248.4	.025	254	60.6	.45	73.6	3.6
14	18.8	4206	241.0	.055	234	55.3	.25	55.0	3.2
15	5.3	161	394.6	.035	210	49.8	.08	2.3	5.8
16	3.2	46	487.3	.060	190	44.6	.05	.7	7.9
17	2.1	95	339.8	.060	126	32.9	.05	2.3	8.3
18	1.2	70	50.5	0.000	64	23.4	.06	3.3	2.4
19	.8	55	139.6	.065	46	17.6	.06	3.7	9.3
20	.7	48	34.4	0.000	20	14.4	.11	7.4	5.3
21	.5	13	17.1	0.000	6	16.0	.25	6.7	8.7
22	4.3	52	1.9	.080	0	3.7	R	R	R
23	0.0	0	0.0	.060	0	0.0	I	I	I

CYCLE COMPOSITE	HC	.435	GRAM/ KW HR	(.324 GS)
	CO	22.700	GRAM/ KW HR	(16.927 GS)
	NOX	6.759	GRAM/ KW HR	(5.040 GS)
	SFC	.386	KG/ KW HR	(.635 GS)
CORRECTED	NOX	6.766	GRAM/ KW HR	(5.045 GS)

TABLE F-5. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-259 RUN-01 03-30-76 EFI-TR-HEI MVA16B-MAIM7-27SECU-EGR6010 K= .975 HUM= 9.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	360	.193	10.30	29	10.532	1860	7	69	2	.232	1.6	16	.9	0.0	901
2 25 PCT T	98	.082	12.79	188	12.878	9117	9	118	93	.077	.3	9	3.3	17.9	312
3 55 PCT T	9	.030	13.35	530	13.381	13562	1	62	179	.197	.2	9	25.6	39.3	160
9 25 PCT T	25	.061	13.35	298	13.919	9026	2	83	59	.077	.1	6	9.2	17.8	312
5 10 PCT T	19	.072	9.86	90	9.933	6396	1	93	19	.057	.1	5	1.1	7.2	901
6 25 PCT T	25	.067	13.35	218	13.919	8981	2	90	97	.077	.1	7	3.6	17.9	312
7 90 PCT T	10	.337	13.93	590	19.268	21727	2	1037	266	.113	.2	117	30.1	65.1	98
8 25 PCT T	19	.051	13.99	255	13.592	8845	1	67	59	.077	.1	5	9.2	18.3	312
9 C.T.	9800	.010	.11	6	.601	0	0	0	0	.193	0.0	0	0.0	0.0	566
1 IDLE	1056	.181	10.07	30	10.367	1819	20	69	2	.232	9.7	15	.9	0.0	901
2 25 PCT T	240	.136	13.21	225	13.373	8890	18	183	98	.077	1.9	19	3.7	17.8	312
3 55 PCT T	69	.051	13.35	710	13.408	13562	7	109	232	.197	1.1	15	39.2	39.9	160
9 25 PCT T	95	.093	13.99	260	13.599	8800	7	122	59	.077	.5	9	9.2	18.9	312
5 10 PCT T	62	.093	9.86	93	9.960	6219	9	117	19	.057	.2	7	1.1	7.9	901
6 25 PCT T	98	.125	13.99	270	13.626	8800	7	169	56	.077	.5	13	9.3	19.0	312
7 90 PCT T	21	.935	13.93	510	19.367	21863	9	1337	251	.113	.9	151	28.9	65.6	98
8 25 PCT T	28	.082	13.93	280	19.015	8669	2	103	56	.077	.2	8	9.3	19.0	312
9 C.T.	9800	.010	.11	7	.601	0	0	0	0	.193	0.0	0	0.0	0.0	566

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I		15.8	0.0	0	9.1	R	R	.098	R	610	20.8	60.3	9.1	.5	5.9	0.0
2 25		12.3	29.0	63	20.1	.839	1.8	.058	.510	2010	17.2	10.9	5.2	9.6	8.8	7.2
3 55		6.3	52.7	137	29.9	.567	3.3	.060	.395	2020	16.6	5.6	5.2	35.3	29.9	30.3
9 25		12.3	23.9	63	19.9	.832	2.3	.060	.506	2010	16.5	5.9	3.7	5.7	8.7	7.2
5 10		15.8	9.6	25	19.1	1.967	2.0	.095	.893	2000	22.0	2.1	3.0	1.5	9.5	2.1
6 25		12.3	29.0	63	19.8	.827	2.0	.060	.503	2010	16.5	5.9	9.0	5.0	8.6	7.2
7 90		1.9	87.3	226	97.9	.599	3.1	.069	.339	2030	15.6	7.3	66.9	91.6	30.6	38.6
8 25		12.3	29.6	65	19.5	.793	2.2	.061	.982	2000	16.9	3.0	3.0	5.7	8.5	7.9
9 CT		22.3	0.0	0	0.0	I	I	.003	I	2000	397.0	0.0	0.0	0.0	0.0	0.0
1 I		15.8	0.0	0	9.0	R	R	.097	R	600	21.1	52.0	6.9	.5	5.3	0.0
2 25		12.3	29.9	63	19.6	.822	2.1	.060	.560	2000	16.6	15.3	6.1	9.6	8.6	7.1
3 55		6.3	52.8	137	29.9	.566	9.9	.060	.399	2020	16.6	11.8	6.6	92.9	25.1	30.0
9 25		12.3	29.6	65	19.9	.788	2.2	.061	.979	2000	16.3	5.9	9.0	5.2	8.5	7.3
5 10		15.8	9.9	26	13.7	1.382	1.9	.096	.891	1980	21.9	2.7	2.9	1.3	9.5	2.2
6 25		12.3	25.9	67	19.9	.763	2.2	.061	.969	2000	16.3	6.1	5.9	5.9	8.5	7.5
7 90		1.9	88.0	227	98.2	.598	2.9	.065	.333	2090	15.5	9.5	65.2	35.2	31.1	38.9
8 25		12.3	25.9	67	19.1	.751	2.2	.063	.957	2000	15.9	1.7	3.9	5.9	8.9	7.6
9 CT		22.3	0.0	0	0.0	I	I	.003	I	2000	397.0	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .1 9 3.8

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .5 12 9.2

TWO CYCLE COMPOSITE - HC- FID 0.35(.1) + 0.65(.5) = .356 G/KW HR (.266 GS)

CO- NDIR 0.35(9.3) + 0.65(12.1) = 11.122 G/KW HR (8.299 GS)

NOX-CL 0.35(3.8) + 0.65(9.2) = 9.077 G/KW HR (3.090 GS)

HC + NOX = 9.939 G/KW HR (3.306 GS)

SFC = .919 KG/KW HR (.681 GS)

ID =

TABLE F-6. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-260 RUN-01 10-20-76 EFI-TR-EGR-HEI HAI-168HVA-AUTO SYS XMEGRM3 K= .990 HUM= 8.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	990	.077	7.95	33	8.079	1633	10	31	2	.232	2.2	7	.5	0.0	939
2 25 PCT T	100	.169	10.19	390	10.365	8210	9	263	84	.077	.7	20	6.5	17.7	353
3 55 PCT T	12	.077	11.61	865	11.688	12927	1	172	299	.197	.2	25	93.9	39.6	178
4 25 PCT T	20	.131	10.69	320	10.773	8029	2	197	74	.077	.1	15	5.7	18.2	356
5 10 PCT T	12	.109	10.76	61	10.870	6759	1	137	12	.057	.0	8	.7	6.8	401
6 25 PCT T	12	.197	10.69	262	10.789	8165	1	225	62	.077	.1	17	4.8	18.3	353
7 90 PCT T	13	.997	19.23	595	19.728	20775	2	1916	262	.113	.2	160	29.6	64.8	53
8 25 PCT T	7	.082	10.76	250	10.843	7847	1	120	56	.077	.0	9	4.3	18.0	353
9 C.T.	3200	.005	.11	11	.935	0	0	0	0	.193	0.0	0	0.0	0.0	579
1 IDLE	960	.072	7.86	27	8.035	1633	21	29	2	.232	4.9	7	.9	0.0	939
2 25 PCT T	208	.198	10.30	290	10.521	8255	18	319	54	.077	1.4	24	4.5	17.7	353
3 55 PCT T	99	.082	11.61	720	11.697	13018	5	185	250	.197	.8	27	36.8	39.5	178
4 25 PCT T	25	.131	10.69	300	10.779	8165	2	200	71	.077	.2	15	5.5	18.2	356
5 10 PCT T	18	.093	10.76	61	10.855	6668	1	115	12	.057	.1	7	.7	6.9	406
6 25 PCT T	20	.125	10.69	290	10.768	8301	2	195	70	.077	.1	15	5.9	18.3	356
7 90 PCT T	20	.559	13.93	590	14.486	20865	3	1612	265	.113	.9	182	30.0	64.3	51
8 25 PCT T	11	.051	10.76	310	10.812	8165	1	78	73	.077	.1	6	5.6	18.3	356
9 C.T.	3200	.005	.11	13	.935	0	0	0	0	.193	0.0	0	0.0	0.0	579

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	HSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I		17.3	0.0	0	3.6	R	R	.037	R	600	26.8	61.1	2.8	.5	5.1	0.0
2 25		13.9	23.7	62	18.1	.764	3.5	.047	.964	2010	21.1	18.9	7.7	6.7	8.9	7.1
3 55		7.0	53.1	138	28.5	.537	5.6	.053	.327	2020	18.8	6.0	9.6	45.7	25.9	30.5
4 25		14.0	29.5	69	17.7	.723	3.0	.049	.990	2010	20.9	3.5	5.8	6.0	8.2	7.9
5 10		15.8	9.2	29	19.9	1.629	1.3	.050	.988	2010	20.2	1.3	3.0	.7	5.1	2.0
6 25		13.9	29.5	69	18.0	.735	2.5	.049	.997	2010	20.3	2.1	6.6	5.0	8.9	7.9
7 90		2.1	86.8	226	95.8	.527	3.0	.066	.321	2020	15.1	5.5	61.0	30.8	31.3	38.3
8 25		13.9	29.1	63	17.3	.717	2.3	.049	.936	2010	20.2	1.2	3.5	4.5	8.1	2.3
9 CT		22.8	0.0	0	0.0	I	I	.002	I	2000	979.5	0.0	0.0	0.0	0.0	0.0
1 I		17.3	0.0	0	3.6	R	R	.037	R	600	26.9	62.0	2.9	.9	5.0	0.0
2 25		13.9	23.7	62	18.2	.768	2.5	.048	.967	2010	20.8	17.6	8.5	5.1	8.9	7.1
3 55		7.0	52.9	138	28.7	.542	4.7	.053	.330	2020	18.8	10.2	9.6	41.9	25.3	30.5
4 25		14.0	29.9	69	18.0	.737	2.9	.049	.998	2010	20.9	2.0	5.9	6.2	8.3	7.9
5 10		16.0	9.2	29	19.7	1.599	1.3	.049	.973	2010	20.2	.9	2.3	.8	5.0	2.1
6 25		14.0	29.5	69	18.3	.747	2.8	.049	.959	2010	20.9	1.7	5.3	6.1	8.5	7.9
7 90		2.0	86.2	229	96.0	.533	3.1	.065	.325	2020	15.3	4.7	64.3	33.8	31.2	38.2
8 25		14.0	29.5	69	18.0	.734	3.0	.049	.996	2010	20.3	.9	2.1	6.3	8.3	7.9
9 CT		22.8	0.0	0	0.0	I	I	.002	I	2000	979.5	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .2 14 5.3

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 15 9.7

TWO CYCLE COMPOSITE -

HC- FID	0.35(.2) + 0.65(.9) =	.339	G/KW HR	(.29	83)
CO- NDIR	0.35(13.7) + 0.65(14.9) =	14.981	G/KW HR	(10.798	83)
NOx-CL	0.35(5.0) + 0.65(9.7) =	9.788	G/KW HR	(3.570	83)
	HC + NOX =	5.121	G/KW HR	(3.819	83)
	SFC =	.396	KG/KW HR	(.650	83)

ID =

TABLE F-7. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-260 RUN-02 10-20-76 EFI-TR-EGR-HEI HAI-168HVA-AUTO SYS XHEGR#3 K= .993 HUM= 8.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	389	.098	7.95	390	8.090	1633	8	90	21	.232	1.9	9	5.0	0.0	939
2 25 PCT T	38	.251	10.53	192	10.785	8255	3	388	96	.077	.2	30	3.5	17.8	353
3 55 PCT T	7	.077	11.29	860	11.318	12927	1	178	308	.197	.1	26	95.2	39.8	178
4 25 PCT T	8	.197	10.76	239	10.908	8079	1	221	59	.077	.1	17	9.2	18.1	353
5 10 PCT T	9	.120	10.53	62	10.651	6668	1	152	12	.057	.0	9	.7	6.8	909
6 25 PCT T	11	.159	10.53	260	10.690	8119	1	293	62	.077	.1	19	9.8	18.3	353
7 90 PCT T	7	.999	13.69	673	19.089	20911	1	1395	313	.113	.1	152	35.3	69.5	53
8 25 PCT T	7	.093	10.19	335	10.289	7575	1	138	77	.077	.0	11	6.0	18.9	356
9 C.T.	5280	.020	.19	130	.739	0	0	0	0	.193	0.0	0	0.0	0.0	589
1 IDLE	848	.082	7.77	282	7.993	1633	19	39	18	.232	9.3	8	9.2	0.0	939
2 25 PCT T	190	.209	10.07	270	10.295	8301	17	332	68	.077	1.3	26	5.2	17.7	353
3 55 PCT T	33	.093	11.12	815	11.217	12837	9	215	292	.197	.6	32	92.9	39.7	178
4 25 PCT T	38	.159	10.30	282	10.963	8029	3	296	68	.077	.2	19	5.2	18.3	353
5 10 PCT T	33	.176	10.30	70	10.479	6622	2	229	19	.057	.1	13	.8	7.1	906
6 25 PCT T	29	.170	10.30	310	10.473	8210	2	269	76	.077	.2	21	5.9	18.3	353
7 90 PCT T	13	.376	13.69	688	19.017	20865	2	1129	321	.113	.2	128	36.2	69.9	53
8 25 PCT T	11	.093	10.91	255	10.509	7530	1	135	57	.077	.1	10	9.9	18.3	353
9 C.T.	5120	.030	.23	110	.779	0	0	0	0	.193	0.0	0	0.0	0.0	589

MODE	ID	----UNITS AS SPECIFIED IN THE 1975 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC (G/KW HR)	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 I		17.3	0.0	0	3.6	R	R	.037	R	600	26.8	73.2	3.9	9.8	5.1	0.0
2 25		13.9	23.9	62	18.2	.763	1.9	.099	.969	2010	20.3	9.3	11.0	3.9	8.5	7.2
3 55		7.0	53.3	139	28.5	.539	5.8	.051	.325	2020	19.9	9.9	9.6	93.2	25.9	30.6
4 25		13.9	24.2	63	17.8	.735	2.2	.050	.997	2010	20.1	1.9	6.2	9.0	8.3	7.3
5 10		15.9	9.2	24	19.7	1.602	1.3	.099	.975	2000	20.6	1.3	3.2	.7	5.1	2.0
6 25		13.9	24.6	64	17.9	.728	2.5	.099	.993	2010	20.5	2.7	6.9	9.5	8.3	7.9
7 90		2.1	86.5	225	96.1	.533	3.6	.069	.329	2020	15.7	5.0	55.8	33.8	31.6	38.1
8 25		14.0	24.6	64	16.7	.678	3.2	.097	.912	2010	21.3	1.6	3.9	5.7	7.8	7.9
9 CT		23.0	0.0	0	0.0	I	I	.009	I	2000	281.9	0.0	0.0	0.0	0.0	0.0
1 I		17.3	0.0	0	3.6	R	R	.037	R	600	27.2	60.9	3.1	9.0	5.1	0.0
2 25		13.9	23.8	62	18.3	.769	2.9	.097	.968	2010	21.2	18.1	10.0	5.0	8.6	7.1
3 55		7.0	53.2	138	28.3	.532	5.5	.051	.323	2020	19.6	8.6	12.9	90.9	25.3	30.5
4 25		13.9	24.6	64	17.7	.720	2.8	.098	.938	2010	20.9	3.5	7.9	5.0	8.3	7.9
5 10		16.0	9.5	25	19.6	1.529	1.5	.098	.930	2000	20.9	1.8	5.0	.8	5.1	2.1
6 25		13.9	24.6	64	18.1	.737	3.1	.098	.998	2010	20.9	2.7	8.1	5.6	8.5	7.9
7 90		2.1	86.9	225	94.0	.532	3.7	.063	.329	2020	15.8	3.5	99.9	39.5	31.6	38.1
8 25		13.9	24.6	64	16.6	.675	2.3	.098	.911	2010	20.9	.9	9.1	9.2	7.8	7.9
9 CT		23.0	0.0	0	0.0	I	I	.009	I	2000	269.5	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .1 19 5.5

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 13 5.5

TWO CYCLE COMPOSITE -

HC- FID	0.35(.1) + 0.65(.9) =	.292	G/KW HR	(.217 BS)
CO- NDIR	0.35(19.3) + 0.65(13.9) =	13.721	G/KW HR	(10.232 BS)
NOx-CL	0.35(5.5) + 0.65(5.5) =	5.503	G/KW HR	(9.109 BS)
	HC + NOX =	5.795	G/KW HR	(9.321 BS)
	SFC =	.391	KG/KW HR	(.693 BS)

ID =

TABLE F-8. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-261 RUN-02 10-21-76 EFI-TR-EGR-HEI 168HVA-HAI-27SECU AUTO SYS K= .905 HUM= 7.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/*	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CMH	VAC. MM
1 IDLE	998	.088	7.86	33	7.996	1592	9	39	2	.232	2.2	8	.9	0.0	960
2 25 PCT T	58	.227	10.76	219	10.999	8255	5	345	99	.077	.9	27	3.8	17.7	368
3 55 PCT T	21	.082	11.99	712	12.075	13018	3	179	231	.197	.9	26	33.9	39.7	193
4 25 PCT T	29	.170	10.76	243	10.933	8119	2	255	59	.077	.2	20	4.2	18.3	368
5 10 PCT T	91	.181	10.91	73	10.996	6577	3	227	19	.057	.2	13	.8	7.9	929
6 25 PCT T	26	.176	11.00	259	11.178	8165	2	259	57	.077	.2	20	4.9	18.0	368
7 90 PCT T	16	.969	19.23	643	19.701	20865	3	1395	279	.113	.3	152	31.0	65.0	58
8 25 PCT T	11	.082	11.12	227	11.209	7711	1	122	97	.077	.1	9	3.6	18.3	368
9 C.T.	3560	.015	.15	7	.527	0	0	0	0	.193	0.0	0	0.0	0.0	605
1 IDLE	960	.072	7.86	28	8.035	1588	20	29	2	.232	4.7	7	.9	0.0	960
2 25 PCT T	160	.263	10.53	200	10.811	8210	13	909	96	.077	1.0	31	3.5	17.8	368
3 55 PCT T	60	.098	12.12	740	12.225	12882	7	209	239	.197	1.0	31	39.5	39.7	193
4 25 PCT T	34	.159	11.00	240	11.162	8255	3	237	53	.077	.2	18	4.1	18.3	368
5 10 PCT T	95	.176	10.30	75	10.480	6577	3	222	19	.057	.2	13	.8	7.9	929
6 25 PCT T	27	.170	10.76	245	10.933	8396	2	262	56	.077	.2	20	4.3	18.0	368
7 90 PCT T	17	.969	13.93	690	14.901	21097	3	1385	299	.113	.3	156	33.8	65.0	56
8 25 PCT T	19	.098	10.88	250	10.980	7620	1	138	52	.077	.1	11	4.0	18.4	368
9 C.T.	3360	.010	.11	7	.456	0	0	0	0	.193	0.0	0	0.0	0.0	605

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I		18.1	0.0	0	3.9	R	R	.037	R	600	27.1	57.9	2.9	.5	4.8	0.0
2 25		19.5	23.8	62	18.2	.765	2.1	.050	.965	2020	19.9	9.9	9.7	4.6	8.5	7.1
3 55		7.6	53.2	138	28.7	.539	4.3	.055	.328	2030	18.3	9.9	9.6	91.3	25.6	30.9
4 25		19.5	29.6	69	19.9	.729	2.2	.050	.993	2020	20.1	4.1	7.1	5.1	8.3	7.9
5 10		16.7	9.9	26	19.5	1.961	1.9	.098	.889	2010	20.7	4.3	4.7	.9	5.0	2.2
6 25		19.5	29.2	63	18.0	.794	2.3	.051	.953	2020	19.6	4.3	7.3	5.3	8.4	7.2
7 90		2.3	87.2	226	96.0	.527	3.1	.066	.321	2030	15.1	7.8	55.3	37.8	31.5	38.3
8 25		19.5	29.6	69	17.0	.691	1.9	.051	.920	2020	19.6	1.7	3.9	4.9	7.3	7.9
9 CT		23.8	0.0	0	0.0	I	I	.002	I	2020	900.1	0.0	0.0	0.0	0.0	0.0
1 I		18.1	0.0	0	3.5	R	R	.037	R	600	26.9	60.9	2.3	.5	4.9	0.0
2 25		19.5	23.8	62	18.1	.760	1.9	.049	.962	2020	20.3	13.3	10.8	4.1	8.4	7.1
3 55		7.6	53.3	138	28.4	.533	4.4	.055	.329	2030	18.1	13.3	10.7	90.9	25.2	30.9
4 25		19.5	29.6	69	18.2	.741	2.2	.051	.950	2020	19.7	2.8	6.9	4.8	8.5	7.9
5 10		16.7	10.0	26	19.5	1.952	1.9	.098	.883	2020	20.9	2.3	4.9	.9	5.0	2.2
6 25		19.5	29.2	63	18.4	.761	2.3	.050	.963	2020	20.1	2.3	7.0	5.1	8.6	7.2
7 90		2.2	87.2	226	96.9	.532	3.9	.065	.329	2030	15.9	4.1	54.6	39.5	31.7	38.3
8 25		19.5	29.6	69	16.8	.682	2.1	.050	.915	2020	20.0	1.1	3.7	4.7	7.8	7.9
9 CT		23.8	0.0	0	0.0	I	I	.002	I	2020	957.3	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .2 19 4.3

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .4 15 4.4

TWO CYCLE COMPOSITE -

HC- FID	0.35(.2) + 0.65(.4) =	.330	G/KW HR	(.296 83)
CO- NDIR	0.35(19.3) + 0.65(19.9) =	19.698	G/KW HR	(10.960 83)
NOX-CL	0.35(4.3) + 0.65(4.4) =	4.382	G/KW HR	(3.268 83)
	HC + NOX =	4.712	G/KW HR	(3.514 83)
	SFC =	.391	KG/KW HR	(.693 83)

ID =

TABLE F-9. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-261 RUN-03 10-21-76 EFI-TR-EGR-HEI 16BMVA-MAI-27SECU AUTO SYS K= .878 HUM= 6.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	956	.093	7.95	39	8.092	1997	9	35	2	.232	2.1	8	.9	0.0	960
2 25 PCT T	53	.239	10.88	213	11.125	8301	9	361	96	.077	.3	28	3.6	17.8	368
3 55 PCT T	17	.077	12.38	722	12.459	13063	2	163	221	.197	.3	29	32.9	39.6	193
4 25 PCT T	21	.197	11.12	232	11.270	8029	2	212	98	.077	.1	16	3.7	18.3	368
5 10 PCT T	90	.169	10.91	72	10.579	6986	3	203	13	.057	.2	12	.7	7.9	929
6 25 PCT T	23	.270	11.00	290	11.172	8165	2	251	51	.077	.1	19	3.9	18.9	368
7 90 PCT T	15	.915	19.08	723	19.997	21092	2	1220	307	.113	.3	138	34.6	65.3	56
8 25 PCT T	11	.072	11.29	223	11.313	7575	1	97	99	.077	.1	7	3.9	18.3	368
9 C.T.	9160	.010	.11	10	.536	0	0	0	0	.193	0.0	0	0.0	0.0	607
1 IDLE	976	.061	7.86	29	8.026	1906	18	22	1	.232	4.3	5	.3	0.0	957
2 25 PCT T	138	.382	11.29	156	11.637	8396	11	553	33	.077	.8	43	2.5	17.8	368
3 55 PCT T	38	.093	11.99	737	12.087	12973	5	202	230	.197	.7	30	33.9	39.8	193
4 25 PCT T	36	.169	11.12	205	11.288	8119	3	239	93	.077	.2	18	3.3	18.4	368
5 10 PCT T	56	.176	10.30	77	10.482	6622	4	229	19	.057	.2	13	.8	7.5	929
6 25 PCT T	29	.176	11.12	208	11.299	8165	2	256	99	.077	.2	20	3.9	18.9	368
7 90 PCT T	20	.997	19.39	618	19.889	21097	3	1919	255	.113	.9	160	28.8	65.5	56
8 25 PCT T	13	.067	11.29	208	11.308	7711	1	92	91	.077	.1	7	3.2	18.9	368
9 C.T.	3920	.010	.15	8	.553	0	0	0	0	.193	0.0	0	0.0	0.0	607

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1	I	18.1	0.0	0	3.3	R	R	.037	R	600	26.8	60.1	3.2	.5	9.6	0.0
2	25	19.5	23.9	62	18.3	.767	1.9	.051	.967	2020	19.7	9.6	11.0	9.3	8.5	7.1
3	55	7.6	53.0	138	28.8	.543	9.2	.056	.330	2020	17.7	8.9	9.5	39.2	25.6	30.3
4	25	19.5	24.5	64	17.7	.722	2.0	.051	.939	2010	19.5	3.6	6.5	9.5	8.3	7.3
5	10	16.7	10.0	26	19.3	1.935	1.3	.098	.873	2010	20.7	9.9	9.6	.9	9.9	2.2
6	25	19.5	24.7	64	18.0	.730	2.1	.051	.999	2020	19.7	9.1	7.7	9.8	8.9	7.9
7	90	2.2	87.5	226	96.5	.531	3.5	.065	.323	2030	15.3	8.0	59.6	91.8	31.8	38.9
8	25	19.5	24.5	64	16.7	.680	1.8	.051	.919	2010	19.9	1.8	3.0	9.0	7.8	7.3
9	CT	23.9	0.0	0	0.0	I	I	.003	I	2010	388.7	0.0	0.0	0.0	0.0	0.0
1	I	18.0	0 0	0	3.1	R	R	.037	R	570	27.0	62.9	1.7	.5	9.9	0.0
2	25	19.5	23.9	62	18.9	.770	1.9	.053	.968	2020	18.9	12.9	19.9	3.3	8.6	7.1
3	55	7.6	53.9	138	28.6	.536	9.3	.055	.326	2030	18.3	9.8	10.0	99.5	25.5	30.3
4	25	19.5	24.6	64	17.9	.726	1.7	.051	.992	2020	19.5	3.2	6.2	9.3	8.9	7.3
5	10	16.7	10.0	26	19.6	1.959	1.9	.093	.885	2020	20.9	3.2	9.3	1.1	5.0	2.2
6	25	19.5	24.7	64	18.0	.728	1.8	.051	.993	2020	19.9	2.6	6.7	9.9	8.9	7.9
7	90	2.2	87.8	227	96.9	.529	2.9	.067	.322	2030	19.9	5.3	59.3	37.8	31.8	38.3
8	25	19.5	24.7	64	17.0	.688	1.7	.051	.918	2020	19.9	1.1	2.9	9.2	7.9	7.9
9	CT	23.9	0.0	0	0.0	I	I	.003	I	2020	377.6	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .2 13 9.3

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 15 9.0

TWO CYCLE COMPOSITE - HC- FID 0.35(.2) + 0.65(.9) = .299 G/KW HR (.219 BS)

CO- NDIR 0.35(13.1) + 0.65(15.9) = 14.589 G/KW HR (10.875 BS)

NOX-CL 0.35(9.3) + 0.65(9.0) = 9.082 G/KW HR (3.099 BS)

HC + NOX = 9.377 G/KW HR (3.269 BS)

ID = SFC = .388 KG/KW HR (.638 BS)

TABLE F-10. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-261 RUN-HOT 10-21-76 EFI-IR-EGR-HEI 168-MAI-275ECU AUTO SYS K= .936 HUM= 8.2 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2030	96	.983	13.78	995	14.268	22997	8	1572	532	8.9	1572	998.2	75.8	8
2	2030	92	.376	13.93	1052	14.310	22861	8	1212	558	7.6	1212	522.1	75.5	8
3	2030	58	.955	14.39	1040	14.852	22952	10	1922	534	10.2	1922	999.3	75.7	8

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- Mv	CHP	CIQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOX	SFC KG/KW HR
1		.3	101.7	263	50.7	.08	15.53	5.26	.999	15.6	.064	.11	20.82	7.05	.303
2		.3	101.3	262	50.9	.08	11.97	5.51	.998	15.5	.069	.10	16.05	7.39	.303
3		.3	101.5	263	50.6	.10	19.09	5.27	.999	15.0	.067	.13	18.83	7.07	.303

ID =

TABLE F-11. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-262 RUN-01 10-22-76 EFI-TR-EGR-HEI 168MVA-MAI-275ECU AUTO SYS K= 1.001 HUM= 10.8 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	532	.088	7.95	32	8.095	1678	12	37	2	.232	2.7	9	.5	0.0	955
2 25 PCT T	101	.187	10.30	308	10.998	8165	9	299	80	.077	.7	23	6.1	17.8	368
3 55 PCT T	12	.082	11.99	568	12.079	13018	1	179	209	.197	.2	26	29.9	39.9	193
4 25 PCT T	35	.197	10.91	329	10.561	8079	3	228	84	.077	.2	18	6.9	18.9	368
5 10 PCT T	52	.216	10.53	68	10.751	6532	3	265	19	.057	.2	15	.8	7.2	922
6 25 PCT T	92	.159	10.91	333	10.573	8119	9	296	85	.077	.3	19	6.5	18.9	368
7 90 PCT T	13	.928	19.08	626	19.510	20865	2	1299	299	.113	.2	191	33.8	65.3	56
8 25 PCT T	12	.109	10.69	233	10.795	7711	1	150	56	.077	.1	12	9.3	18.9	368
9 C.T.	3360	.010	.11	10	.956	0	0	0	0	.193	0.0	0	0.0	0.0	597
1 IDLE	896	.072	7.86	29	8.028	1588	19	29	2	.232	9.9	7	.9	0.0	950
2 25 PCT T	230	.181	10.91	252	10.616	8210	20	283	65	.077	1.5	22	5.0	17.8	368
3 55 PCT T	35	.098	11.73	580	11.832	13063	9	219	213	.197	.6	32	31.3	39.9	193
4 25 PCT T	59	.197	10.53	302	10.683	8165	5	228	77	.077	.3	18	5.9	18.9	368
5 10 PCT T	69	.209	10.30	65	10.511	6622	9	260	19	.057	.3	15	.8	7.5	922
6 25 PCT T	55	.159	10.30	316	10.965	8165	5	250	82	.077	.9	19	6.3	18.9	368
7 90 PCT T	18	.325	19.08	723	19.907	20956	3	953	350	.113	.3	108	39.5	65.3	56
8 25 PCT T	19	.109	10.91	298	10.516	7939	1	198	70	.077	.1	11	5.9	18.3	368
9 C.T.	3360	.010	.11	13	.956	0	0	0	0	.193	0.0	0	0.0	0.0	597

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 I	0.15	17.9	0.0	0	3.7	R	R	.037	R	600	26.8	59.3	3.3	.6	5.2	0.0
2 25	1.83	19.5	23.9	62	18.0	.752	3.3	.098	.957	2020	20.9	19.3	8.7	6.9	8.9	7.1
3 55	1.69	7.6	53.5	138	28.7	.537	3.8	.055	.326	2030	18.3	9.6	10.1	33.8	25.5	30.9
4 25	1.73	19.5	29.7	69	17.8	.721	3.9	.098	.939	2020	20.7	9.9	6.7	7.3	8.3	7.9
5 10	2.37	16.6	9.7	25	19.9	1.992	1.9	.099	.908	2020	20.9	9.3	5.8	.9	5.0	2.1
6 25	1.78	19.5	29.7	69	17.9	.729	3.5	.098	.991	2020	20.7	5.9	7.3	7.9	8.3	7.9
7 90	0.31	2.2	87.6	227	96.0	.525	3.9	.065	.319	2030	15.3	5.2	53.8	38.2	31.9	38.3
8 25	1.78	19.5	29.7	69	17.0	.689	2.3	.099	.919	2020	20.9	1.6	9.9	9.8	7.9	7.9
9 CT	0.08	23.5	0.0	0	0.0	I	I	.002	I	2020	957.3	0.0	0.0	0.0	0.0	0.0
1 I		17.7	0.0	0	3.5	R	R	.037	R	600	27.0	55.9	2.9	.5	9.9	0.0
2 25		19.5	23.9	62	18.1	.756	2.7	.098	.960	2020	20.6	18.9	9.9	5.3	8.9	7.1
3 55		7.6	53.5	138	28.8	.538	9.0	.059	.327	2030	18.6	7.9	13.9	33.1	25.6	30.9
4 25		19.5	29.7	69	18.0	.729	3.1	.099	.999	2020	20.5	9.9	7.6	6.2	8.9	7.3
5 10		16.6	10.0	26	19.6	1.956	1.9	.098	.886	2020	20.8	3.2	6.9	.8	5.0	2.2
6 25		19.5	29.7	69	18.0	.729	3.3	.098	.999	2020	20.9	9.6	8.3	6.7	8.9	7.3
7 90		2.2	87.6	227	96.2	.527	9.0	.065	.321	2030	15.9	9.2	96.6	91.8	31.6	38.3
8 25		19.5	29.6	69	16.9	.667	2.9	.098	.906	2010	20.8	1.9	9.9	5.7	7.6	7.3
9 CT		23.5	0.0	0	0.0	I	I	.002	I	2010	957.3	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .2 19 9.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 12 9.9

TWO CYCLE COMPOSITE - HC- FID 0.35(.2) + 0.65(.9) = .353 G/KW HR (.263 BB)

CO- NDIR 0.35(13.6) + 0.65(12.0) = 12.575 G/KW HR (9.377 BB)

NOX-CL 0.35(9.6) + 0.65(9.9) = 9.806 G/KW HR (3.589 BB)

HC + NOX = 5.160 G/KW HR (3.897 BB)

SFC = .389 KG/KW HR (.639 BB)

ID = INTAKE CO2

TABLE F-12. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-262 RUN-02 10-22-76 EFI-TR-EGR-HEI 168HVA-HAI-275ECU AUTO SYS K= 1.001 HUM= 10.8 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	636	.088	8.23	29	8.386	1588	13	33	2	.232	3.0	8	.9	0.0	950
2 25 PCT T	155	.193	10.76	189	10.970	8210	13	291	97	.077	1.0	22	3.6	17.7	368
3 55 PCT T	29	.093	12.25	590	12.396	12973	3	197	189	.197	.9	29	27.7	39.7	193
4 25 PCT T	56	.197	10.76	280	10.919	8119	5	222	69	.077	.9	17	5.3	18.3	368
5 10 PCT T	58	.198	10.76	60	10.965	6986	4	237	12	.057	.2	14	.7	7.5	922
6 25 PCT T	52	.169	10.88	290	11.050	8029	4	291	70	.077	.3	19	5.4	18.4	368
7 90 PCT T	15	.331	19.59	663	19.873	20911	2	990	310	.113	.3	106	35.0	65.2	56
8 25 PCT T	17	.115	11.00	290	11.116	7939	1	155	53	.077	.1	12	4.1	18.1	368
9 C.T.	3490	.005	.08	9	.929	0	0	0	0	.193	0.0	0	0.0	0.0	597
1 IDLE	1016	.082	8.23	29	8.922	1633	21	32	2	.232	4.9	7	.9	0.0	950
2 25 PCT T	259	.209	10.76	232	10.992	8210	21	308	58	.077	1.6	24	4.4	17.8	368
3 55 PCT T	90	.093	12.25	593	12.347	12837	5	195	188	.197	.7	24	27.6	39.8	193
4 25 PCT T	63	.197	10.69	312	10.799	7938	5	219	76	.077	.9	17	5.9	18.4	368
5 10 PCT T	66	.198	10.76	63	10.966	6991	4	235	12	.057	.2	13	.7	7.5	922
6 25 PCT T	58	.169	10.69	312	10.811	7983	5	295	77	.077	.9	19	5.9	18.4	368
7 90 PCT T	19	.318	19.59	791	19.860	21001	3	909	398	.113	.3	103	39.3	65.2	56
8 25 PCT T	20	.115	10.88	277	10.997	7939	1	156	62	.077	.1	12	4.8	18.4	368
9 C.T.	3680	.010	.08	13	.958	0	0	0	0	.193	0.0	0	0.0	0.0	597

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL--------- HC	CO	NOX	FUEL	POWER
1 I	0.15	17.7	0.0	0	3.5	R	R	.039	R	600	25.4	53.1	3.4	.5	4.4	.0
2 25	1.83	19.5	23.8	62	18.1	.761	2.0	.050	.463	2010	20.0	17.4	4.4	4.4	8.5	7.1
3 55	1.73	7.6	53.2	138	28.6	.538	3.6	.056	.327	2020	17.4	7.3	12.8	33.7	25.6	30.4
4 25	1.83	19.5	24.6	64	17.4	.728	2.8	.050	.443	2010	20.1	6.2	7.5	6.5	8.4	7.3
5 10	2.64	16.6	10.0	26	14.3	1.431	1.2	.050	.870	2010	20.0	3.8	6.0	.8	5.0	2.2
6 25	1.83	19.5	24.6	64	17.7	.714	2.4	.050	.437	2010	19.4	5.7	8.2	6.6	8.3	7.4
7 90	0.27	2.2	87.4	227	96.1	.528	3.6	.067	.321	2020	15.0	4.8	96.4	92.5	31.7	38.3
8 25	1.83	19.5	24.3	63	16.4	.674	2.2	.051	.411	2010	19.8	1.7	5.3	5.0	7.7	7.3
9 CT	0.08	23.5	0.0	0	0.0	I	I	.002	I	2010	486.1	0.0	0.0	0.0	0.0	0.0
1 I		17.7	0.0	0	3.6	R	R	.039	R	600	25.7	56.8	3.3	.5	5.1	0.0
2 25		19.5	23.4	62	18.1	.758	2.4	.050	.461	2010	19.4	18.6	10.6	5.0	8.5	7.1
3 55		7.6	53.4	139	28.3	.530	3.5	.056	.322	2020	17.4	7.4	12.8	31.0	25.4	30.4
4 25		19.5	24.6	64	17.5	.710	3.1	.049	.432	2010	20.3	4.5	7.5	6.6	8.2	7.3
5 10		16.6	10.0	26	14.2	1.418	1.2	.050	.863	2010	20.0	2.8	6.0	.8	4.4	2.2
6 25		19.5	24.6	64	17.6	.714	3.1	.049	.434	2010	20.3	4.2	8.4	6.6	8.3	7.3
7 90		2.2	87.5	227	96.3	.529	4.0	.067	.322	2020	15.0	4.0	95.4	99.2	31.4	38.3
8 25		19.5	24.6	64	16.4	.666	2.5	.050	.405	2010	20.0	1.3	5.4	5.4	7.7	7.3
9 CT		23.5	0.0	0	0.0	I	I	.002	I	2010	455.2	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 12 4.3

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .5 12 4.7

TWO CYCLE COMPOSITE -

HC- FID	0.35(.3) + 0.65(.5) =	.398	G/KW HR	(.297 BS)
CO- NDIR	0.35(11.8) + 0.65(11.7) =	11.790	G/KW HR	(8.755 BS)
NOX-CL	0.35(4.3) + 0.65(4.7) =	4.530	G/KW HR	(3.372 BS)
	HC + NOX =	4.928	G/KW HR	(3.675 BS)
	SFC =	.387	KG/KW HR	(.636 BS)

ID = INTAKE CO2

TABLE F-13. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-262 RUN-03 10-22-76 EFI-TR-EGR-HEI 168HVA-HAI-275ECU AUTO SYS K= .985 HUM= 10.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	528	.082	8.19	30	8.279	1588	11	32	2	.232	2.5	7	.9	0.0	455
2 25 PCT T	112	.181	10.30	263	10.993	8937	10	299	69	.077	.8	23	5.3	17.8	368
3 55 PCT T	13	.077	12.38	993	12.958	13109	2	169	170	.197	.2	29	29.9	39.3	193
4 25 PCT T	39	.136	10.76	299	10.901	7983	3	202	70	.077	.2	16	5.9	18.9	368
5 10 PCT T	96	.181	10.69	67	10.826	6532	3	221	11	.057	.2	13	.6	6.9	922
6 25 PCT T	91	.169	10.76	300	10.929	8165	3	298	73	.077	.3	19	5.6	18.9	368
7 90 PCT T	11	.376	14.23	690	14.607	21183	2	1100	309	.113	.2	124	39.3	65.5	56
8 25 PCT T	11	.109	10.76	263	10.865	7666	1	198	61	.077	.1	11	4.7	18.9	368
9 C.T.	3990	.005	.08	6	.929	0	0	0	0	.193	0.0	0	0.0	0.0	597
1 IDLE	920	.072	7.95	25	8.121	1588	19	28	2	.232	4.5	7	.9	0.0	455
2 25 PCT T	222	.193	10.53	220	10.797	8255	19	299	55	.077	1.9	23	4.3	18.0	368
3 55 PCT T	35	.088	12.12	502	12.211	13159	4	191	177	.197	.6	28	26.0	39.9	193
4 25 PCT T	54	.153	10.53	265	10.689	8119	5	235	66	.077	.3	18	5.1	18.6	368
5 10 PCT T	58	.181	10.91	58	10.598	6577	4	227	12	.057	.2	13	.7	6.9	922
6 25 PCT T	51	.159	10.53	305	10.699	8210	4	296	77	.077	.3	19	5.9	18.5	368
7 90 PCT T	16	.337	14.23	669	14.569	21273	3	999	317	.113	.3	112	35.8	65.7	56
8 25 PCT T	17	.109	10.53	290	10.636	7756	1	153	69	.077	.1	12	5.3	18.5	368
9 C.T.	3200	.005	.08	8	.905	0	0	0	0	.193	0.0	0	0.0	0.0	597

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	0.15	17.9	0.0	0	3.5	R	R	.038	R	600	26.2	56.7	3.1	.5	9.9	0.0
2 25	1.69	19.5	23.9	62	18.6	.779	2.9	.098	.979	2010	20.9	17.1	9.6	6.5	8.6	7.1
3 55	1.69	7.6	52.7	137	28.9	.549	3.2	.056	.339	2020	17.7	5.0	10.2	30.6	25.5	30.1
4 25	1.69	19.5	29.7	69	17.6	.713	2.9	.050	.939	2010	20.1	5.9	6.6	6.7	8.1	7.9
5 10	2.32	16.6	9.3	29	19.9	1.555	1.2	.099	.996	2010	20.3	3.9	5.3	.8	9.9	2.1
6 25	1.69	19.5	29.7	65	18.0	.729	3.0	.050	.993	2010	20.1	5.8	8.1	6.9	8.3	7.9
7 90	0.31	2.2	87.8	228	96.7	.532	3.5	.066	.329	2020	15.2	9.6	52.9	92.1	31.7	38.5
8 25	1.88	19.5	29.7	65	16.9	.683	2.5	.050	.916	2010	20.2	1.5	9.8	5.7	7.8	7.9
9 CT	0.08	23.5	0.0	0	0.0	I	I	.002	I	2010	986.1	0.0	0.0	0.0	0.0	0.0
1 I		17.9	0.0	0	3.5	R	R	.037	R	600	26.7	57.1	2.8	.9	9.9	0.0
2 25		19.5	29.1	63	18.2	.756	2.3	.099	.960	2020	20.9	18.9	9.9	5.1	8.9	7.1
3 55		7.6	53.5	138	29.0	.592	3.3	.055	.330	2030	18.1	7.9	12.1	31.2	25.5	30.3
4 25		19.5	29.9	65	17.9	.719	2.7	.099	.938	2020	20.5	9.9	7.8	6.1	8.3	7.9
5 10		16.6	9.3	29	19.5	1.563	1.3	.098	.951	2010	20.7	2.9	5.6	.8	5.0	2.0
6 25		19.5	29.9	65	18.1	.728	3.1	.099	.993	2020	20.5	9.2	8.2	7.1	8.3	7.9
7 90		2.2	88.1	228	96.9	.532	3.6	.065	.329	2030	15.3	3.8	98.5	93.0	31.8	38.9
8 25		19.5	29.9	65	17.1	.688	2.8	.099	.918	2020	20.6	1.3	5.1	6.9	7.9	7.9
9 CT		23.5	0.0	0	0.0	I	I	.002	I	2020	515.0	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------			.2	12	9.3
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------			.9	12	9.9
TWO CYCLE COMPOSITE -	HC- FID 0.35(.2) + 0.65(.9) =	.398	G/KW HR	(.260 BS)	
	CO- NDIR 0.35(12.5) + 0.65(12.1) =	12.217	G/KW HR	(9.110 BS)	
	NOX-CL 0.35(9.3) + 0.65(9.9) =	9.325	G/KW HR	(3.225 BS)	
	HC + NOX =	9.679	G/KW HR	(3.485 BS)	
	SFC =	.392	KG/KW HR	(.699 BS)	

ID = INTAKE CO2

TABLE F-14. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-262 RUN-HOT 10-22-76 EFI-TR-EGR-HEI 168-MAI-27SECU AUTO SYS K= 1.001 HUM= 10.8 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1	2030	50	.915	13.93	920	19.351	23088	9	1399	991	9.1	1399	992.1	75.3	8
2	2030	55	.990	19.23	882	19.726	22997	10	1595	957	9.8	1595	958.0	75.5	8
3	2030	52	.518	19.23	899	19.759	23587	9	1673	951	9.9	1673	951.3	75.6	8

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- MV	CMP	CTQ	FC	BSHC	BSCO	BSNOx	BSFC	---CALC--- A/F	F/A	--------G/KW HR------ HC	CO	NOx	SFC KG/KW HR
1		.3	101.0	261	50.9	.09	13.92	9.89	.509	15.5	.065	.12	18.00	6.56	.307
2		.3	101.2	262	50.7	.10	15.38	9.55	.501	15.1	.066	.13	20.62	6.10	.305
3		.3	101.9	262	52.0	.09	16.65	9.98	.513	15.1	.066	.13	22.33	6.01	.312

ID =

TABLE F-15. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-263 RUN-01 10-25-76 EFI-TR-EGR-HEI 16BNVA-WA1-275FCU AUTO SYS K= .950 HUM= 8.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	552	.093	8.23	37	8.3Re	1588	11	36	2	.232	2.6	8	.5	0.0	999
2 25 PCT T	108	.170	10.53	270	10.712	8396	9	267	66	.077	.7	21	5.1	17.9	358
3 55 PCT T	15	.082	11.99	650	12.079	13336	2	189	226	.147	.3	27	33.3	39.8	178
4 25 PCT T	26	.197	10.74	310	10.910	8119	2	222	73	.077	.2	17	5.6	18.5	358
5 10 PCT T	99	.193	10.53	90	10.727	6622	3	290	18	.057	.2	19	1.0	6.9	911
6 25 PCT T	36	.170	10.69	305	10.819	8165	3	259	73	.077	.2	20	5.6	18.5	358
7 90 PCT T	12	.300	14.23	715	14.531	21092	2	879	327	.113	.2	99	37.0	65.0	53
8 25 PCT T	19	.098	10.88	320	10.980	7756	1	190	71	.077	.1	11	5.5	18.5	358
9 C.T.	3200	.010	.11	8	.990	0	0	0	0	.193	0.0	0	0.0	0.0	597
1 IDLE	880	.082	8.09	31	8.217	1592	18	31	2	.232	4.1	.7	.9	0.0	992
2 25 PCT T	200	.263	10.53	220	10.815	8391	17	912	54	.077	1.3	32	4.1	18.0	358
3 55 PCT T	36	.109	11.86	650	11.968	13972	5	236	231	.147	.7	35	33.9	40.2	178
4 25 PCT T	99	.193	10.76	245	10.957	8119	4	288	62	.077	.3	22	4.8	18.5	358
5 10 PCT T	67	.209	10.53	100	10.791	6713	5	258	20	.057	.3	15	1.1	7.0	911
6 25 PCT T	97	.193	10.76	290	10.958	8210	4	291	69	.077	.3	22	5.3	18.5	358
7 90 PCT T	20	.300	15.23	730	15.532	21137	3	829	313	.113	.4	93	35.9	65.2	53
8 25 PCT T	19	.109	10.76	280	10.866	7756	1	150	63	.077	.1	12	4.9	18.6	358
9 C.T.	3200	.020	.15	10	.991	0	0	0	0	.193	0.0	0	0.0	0.0	597

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	0.27	17.5	0.0	0	3.5	R	R	.039	R	600	25.9	58.5	3.8	.5	4.9	0.0
2 25	1.78	19.1	29.0	62	18.9	.767	2.8	.049	.967	2020	20.5	15.9	9.5	5.5	8.5	7.2
3 55	1.69	7.0	53.9	139	29.9	.550	4.3	.055	.335	2020	18.3	6.1	12.5	35.6	25.9	30.9
4 25	1.78	19.1	29.8	64	17.9	.722	3.0	.050	.939	2020	20.1	3.7	7.9	6.0	8.2	7.9
5 10	2.37	16.2	9.3	29	19.6	1.577	1.9	.049	.960	2010	20.9	3.8	6.3	1.1	5.0	2.0
6 25	1.78	19.1	29.8	65	18.0	.725	3.0	.049	.991	2020	20.3	5.2	9.2	6.0	8.3	7.9
7 90	0.39	2.1	87.2	226	96.5	.533	3.8	.065	.329	2030	15.3	5.0	95.8	39.5	31.9	38.2
8 25	2.17	19.1	29.8	65	17.1	.689	2.9	.050	.919	2020	20.0	1.9	5.0	5.9	7.9	7.9
9 CT	0.15	23.5	0.0	0	0.0	I	I	.002	I	2020	979.0	0.0	0.0	0.0	0.0	0.0
1 I		17.9	0.0	0	3.9	R	R	.038	R	580	26.9	55.7	3.0	.5	4.7	0.0
2 25		19.1	29.1	63	18.5	.768	2.3	.049	.967	2020	20.3	17.8	13.9	4.6	8.5	7.2
3 55		7.0	53.8	139	29.7	.552	4.3	.059	.335	2030	18.9	8.9	14.6	37.7	26.0	30.5
4 25		19.1	29.8	65	17.9	.720	2.5	.050	.938	2020	20.0	3.7	9.3	5.3	8.2	7.9
5 10		16.2	9.3	29	19.8	1.587	2.1	.049	.965	2020	20.9	3.5	6.2	1.2	5.0	2.1
6 25		19.1	29.9	65	18.1	.728	2.8	.050	.993	2020	20.0	4.0	9.9	5.9	8.3	7.9
7 90		2.1	87.5	226	96.6	.533	3.6	.069	.324	2030	14.9	4.8	39.2	39.9	31.9	38.1
8 25		19.1	29.9	65	17.1	.687	2.6	.050	.918	2020	20.2	1.6	4.8	5.9	7.8	7.9
9 CT		23.5	0.0	0	0.0	I	I	.002	I	2020	925.5	0.0	0.0	0.0	0.0	0.0
SUM---(COMPOSITE VALUE FOR CYCLE 1)----------												.2	11	4.9		
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------												.4	12	4.7		

TWO CYCLE COMPOSITE -

HC- FID	0.35(.2) + 0.65(.4) =	.333	G/KW HR	(.248 BS)		
CO- NDIR	0.35(11.3) + 0.65(12.4) =	12.039	G/KW HR	(8.979 BS)		
NOX-CL	0.35(4.9) + 0.65(4.7) =	4.767	G/KW HR	(3.555 BS)		
	HC + NOX =	5.100	G/KW HR	(3.803 BS)		
	SFC =	.399	KG/KW HR	(.697 BS)		

ID = INTAKE CO2

TABLE F-16. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-263 RUN-02 10-25-76 EFI-TR-EGR-HEI 168MVA-MAI-275ECU AUTO SYS K= .919 HUM= 7.6 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	589	.082	8.23	37	8.375	1592	17	31	2	.232	2.7	7	.5	0.0	997
2 25 PCT T	129	.193	10.76	280	10.966	8255	10	293	64	.077	.8	23	5.0	17.9	358
3 55 PCT T	22	.082	12.38	670	12.965	13295	3	177	217	.197	.9	26	31.9	39.8	178
4 25 PCT T	31	.159	11.24	290	11.502	8210	2	231	64	.077	.2	18	4.9	18.5	358
5 10 PCT T	64	.187	10.53	110	10.729	6713	4	236	21	.057	.3	13	1.2	6.9	911
6 25 PCT T	96	.181	11.00	325	11.186	8255	4	270	73	.077	.3	21	5.6	18.5	358
7 90 PCT T	17	.263	19.86	720	19.125	20865	3	733	303	.113	.3	83	39.3	65.0	53
8 25 PCT T	19	.098	11.98	290	11.580	7756	1	133	59	.077	.1	10	4.6	18.5	358
9 C.T.	3520	.010	.19	10	.553	0	0	0	0	.193	0.0	0	0.0	0.0	597
1 IDLE	960	.077	8.23	37	8.410	1997	18	28	2	.232	4.3	6	.5	0.0	997
2 25 PCT T	200	.287	11.12	210	11.430	8396	14	429	47	.077	1.2	33	3.6	17.9	358
3 55 PCT T	42	.088	12.25	680	12.392	13200	5	189	222	.197	.7	28	32.6	90.0	178
4 25 PCT T	50	.176	11.00	300	11.181	8079	4	256	66	.077	.3	20	5.1	18.5	358
5 10 PCT T	83	.181	10.53	110	10.720	6809	6	232	21	.057	.3	13	1.2	7.5	911
6 25 PCT T	50	.198	11.00	280	11.209	8301	4	297	63	.077	.3	23	4.9	18.5	358
7 90 PCT T	20	.239	19.59	735	19.781	20820	3	681	316	.113	.4	77	35.7	65.1	53
8 25 PCT T	20	.109	11.29	280	11.396	7802	2	199	59	.077	.1	11	4.5	18.5	358
9 C.T.	3520	.010	.15	13	.513	0	0	0	0	.193	0.0	0	0.0	0.0	597

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	0.23	17.6	0.0	0	3.9	R	R	.039	R	590	25.9	53.7	3.5	.5	9.7	0.0
2 25	2.07	19.1	29.0	62	18.2	.758	2.7	.050	.961	2020	20.0	15.8	11.2	5.6	8.9	7.2
3 55	1.64	7.0	53.9	139	29.2	.597	4.1	.056	.333	2020	17.7	7.7	12.9	36.3	25.8	30.9
4 25	2.08	19.1	29.8	64	18.1	.731	2.6	.052	.999	2020	19.3	3.8	8.8	5.6	8.9	7.9
5 10	2.32	16.2	9.3	24	14.8	1.593	2.7	.099	.969	2020	20.9	5.0	6.7	1.9	5.1	2.1
6 25	2.08	19.1	29.8	64	18.2	.735	3.0	.051	.997	2020	19.6	5.8	10.9	6.9	8.9	7.9
7 90	0.93	2.1	87.1	225	96.0	.528	3.5	.068	.321	2030	14.8	6.0	91.3	39.0	31.2	38.2
8 25	2.02	19.1	29.8	64	17.1	.690	2.9	.053	.919	2020	19.0	2.2	5.1	5.2	7.9	7.9
9 CT	0.15	23.5	0.0	0	0.0	I	I	.003	I	2020	377.7	0.0	0.0	0.0	0.0	0.0
1 I		17.6	0.0	0	3.3	R	R	.039	R	580	25.8	55.6	3.0	.5	9.6	0.0
2 25		19.1	29.0	62	18.9	.766	2.0	.052	.986	2020	19.2	16.2	15.5	9.1	8.5	7.1
3 55		7.0	53.7	139	29.1	.592	4.2	.056	.330	2030	17.9	9.6	13.2	37.0	25.8	30.5
4 25		19.1	29.8	64	17.8	.719	2.7	.051	.937	2020	19.6	9.0	9.9	5.8	8.3	7.9
5 10		16.2	10.1	26	15.0	1.989	2.1	.099	.906	2020	20.9	9.3	6.3	1.9	5.1	2.2
6 25		19.1	29.8	65	18.3	.737	2.6	.051	.999	2020	19.6	9.1	10.9	5.5	8.5	7.9
7 90		2.1	87.3	226	95.9	.526	3.7	.066	.320	2030	15.1	9.7	36.5	90.5	31.2	38.1
8 25		19.1	29.8	65	17.2	.693	2.9	.052	.922	2020	19.9	1.5	5.3	5.1	8.0	7.9
9 CT		23.5	0.0	0	0.0	I	I	.002	I	2020	907.2	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 11 9.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 11 9.6

TWO CYCLE COMPOSITE - HC- FID 0.35(.3) + 0.65(.9) = .352 G/KW HR (.262 BS)

CO- NDIR 0.35(10.5) + 0.65(11.0) = 10.817 G/KW HR (8.066 BS)

NOX-CL 0.35(9.6) + 0.65(9.6) = 9.598 G/KW HR (3.928 BS)

HC + NOX = 9.949 G/KW HR (3.691 BS)

SFC = .341 KG/KW HR (.692 BS)

ID = INTAKE CO2

TABLE F-17. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-263 TEST-263 RUN-1EGR 10-25-76 SAMPLE OF RECIRCULATED EXHAUST K= .965 HUM= 9.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	869	.051	6.17	15	6.312	1588	23	26	1	.232	5.3	6	.3	0.0	999
2 25 PCT T	608	.136	9.86	190	10.063	8396	55	229	50	.077	9.2	18	3.9	17.8	358
3 55 PCT T	789	.109	10.69	620	10.830	13926	107	260	296	.197	15.7	38	36.2	39.3	178
4 25 PCT T	980	.197	10.19	290	10.390	8210	92	235	61	.077	3.2	18	9.7	18.9	358
5 10 PCT T	972	.216	9.86	90	10.127	6809	35	293	19	.057	2.0	17	1.1	6.9	911
6 25 PCT T	996	.170	10.19	250	10.419	8301	93	279	69	.077	3.3	21	9.9	18.9	358
7 90 PCT T	2112	1.137	8.81	770	10.177	21001	976	9738	509	.113	53.8	535	57.5	69.9	53
8 25 PCT T	932	.109	10.07	260	10.221	7756	36	159	63	.077	2.8	12	9.9	18.9	358
9 C.T.	3200	.010	.15	8	.980	0	0	0	0	.193	0.0	0	0.0	0.0	597
1 IDLE	869	.051	6.17	15	6.312	1588	23	26	1	.232	5.3	6	.3	0.0	999
2 25 PCT T	608	.136	9.86	190	10.063	8396	55	229	50	.077	9.2	18	3.9	17.8	358
3 55 PCT T	789	.109	10.69	620	10.830	13926	107	260	296	.197	15.7	38	36.2	39.3	178
4 25 PCT T	980	.197	10.19	290	10.390	8210	92	235	61	.077	3.2	18	9.7	18.9	358
5 10 PCT T	972	.216	9.86	90	10.127	6809	35	293	19	.057	2.0	17	1.1	6.9	911
6 25 PCT T	996	.170	10.19	250	10.419	8301	93	279	69	.077	3.3	21	9.9	18.9	358
7 90 PCT T	2112	1.137	8.81	770	10.177	21001	976	9738	509	.113	53.8	535	57.5	69.9	53
8 25 PCT T	932	.109	10.07	260	10.221	7756	36	159	63	.077	2.8	12	9.9	18.9	358
9 C.T.	3200	.010	.15	8	.980	0	0	0	0	.193	0.0	0	0.0	0.0	597

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I		17.5	0.0	0	3.5	R	R	.029	R	600	39.1	5.9	.9	.2	9.8	0.0
2 25		19.1	23.9	62	18.9	.769	2.1	.046	.968	2010	21.7	9.7	2.6	3.9	8.9	7.2
3 55		7.0	52.7	137	29.6	.562	9.7	.099	.342	2020	20.2	17.9	5.7	31.9	25.9	30.2
4 25		19.1	29.7	69	18.1	.739	2.5	.097	.996	2010	21.1	3.5	2.7	9.1	8.3	7.9
5 10		16.2	9.2	29	15.0	1.623	2.1	.096	.987	2010	21.6	2.2	2.5	1.0	5.1	2.1
6 25		19.1	29.6	69	18.3	.793	2.6	.098	.952	2010	21.0	3.7	3.2	9.3	8.9	7.9
7 90		2.1	87.0	225	96.3	.532	5.9	.097	.329	2030	21.2	59.5	80.5	50.7	31.2	38.3
8 25		19.1	29.7	65	17.1	.692	2.6	.097	.921	2010	21.9	3.1	1.8	9.3	7.8	7.9
9 CT		23.5	0.0	0	0.0	I	I	.002	I	2020	939.5	0.0	0.0	0.0	0.0	0.0
1 I		17.5	0.0	0	3.5	R	R	.029	R	600	39.1	5.9	.9	.2	9.8	0.0
2 25		19.1	23.9	62	18.9	.769	2.1	.046	.968	2010	21.7	9.7	2.6	3.9	8.9	7.2
3 55		7.0	52.7	137	29.6	.562	9.7	.099	.342	2020	20.2	17.9	5.7	31.9	25.9	30.2
4 25		19.1	29.7	69	18.1	.739	2.5	.097	.996	2010	21.1	3.5	2.7	9.1	8.3	7.9
5 10		16.2	9.2	29	15.0	1.623	2.1	.096	.987	2010	21.6	2.2	2.5	1.0	5.1	2.1
6 25		19.1	29.6	69	18.3	.793	2.6	.098	.952	2010	21.0	3.7	3.2	9.3	8.9	7.9
7 90		2.1	87.0	225	96.3	.532	5.9	.097	.329	2030	21.2	59.5	80.5	50.7	31.2	38.3
8 25		19.1	29.7	65	17.1	.692	2.6	.097	.921	2010	21.9	3.1	1.8	9.3	7.8	7.9
9 CT		23.5	0.0	0	0.0	I	I	.002	I	2020	939.5	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 9.8 35 6.0

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 9.8 35 6.0

TWO CYCLE COMPOSITE - HC- FID 0.35(9.8) + 0.65(9.8) = 9.759 G/KW HR (3.595 BS)

CO- NDIR 0.35(35.0) + 0.65(35.0) = 35.011 G/KW HR (26.108 BS)

NOX-CL 0.35(6.0) + 0.65(6.0) = 5.968 G/KW HR (9.951 BS)

HC + NOX = 10.722 G/KW HR (7.996 BS)

ID = SFC = .398 KG/KW HR (.655 BS)

TABLE F-18. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
SAMPLE OF RECIRCULATED EXHAUST

K= .911 HUM= 7.3 G/KG

ENGINE-2 TEST-263 RUN-2EGR 10-25-76

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	1120	.077	6.17	19	6.365	1906	26	39	1	.232	6.1	8	.2	0.0	997
2 25 PCT T	592	.170	10.07	200	10.305	8210	52	273	98	.077	4.0	21	3.7	18.0	358
3 55 PCT T	752	.153	10.76	630	10.996	13109	99	368	227	.197	19.5	59	33.9	40.2	178
4 25 PCT T	496	.193	10.30	265	10.597	8119	42	300	62	.077	3.2	23	4.8	18.6	358
5 10 PCT T	480	.216	9.96	80	10.228	6491	33	279	15	.057	1.9	16	.9	7.5	911
6 25 PCT T	490	.209	10.30	250	10.557	8255	41	322	59	.077	3.2	25	4.6	18.6	358
7 90 PCT T	2272	1.157	8.71	810	10.115	20820	510	1811	509	.113	57.7	599	57.0	65.2	53
8 25 PCT T	416	.136	9.96	275	10.192	7666	39	208	63	.077	2.6	16	4.8	18.6	358
9 C.T.	3200	.020	.15	10	.991	0	0	0	0	.193	0.0	0	0.0	0.0	597
1 IDLE	1120	.077	6.17	19	6.365	1906	26	39	1	.232	6.1	8	.2	0.0	997
2 25 PCT T	592	.170	10.07	200	10.305	8210	52	273	98	.077	4.0	21	3.7	18.0	358
3 55 PCT T	752	.153	10.76	630	10.996	13109	99	368	227	.197	19.5	59	33.9	40.2	178
4 25 PCT T	496	.193	10.30	265	10.597	8119	42	300	62	.077	3.2	23	4.8	18.6	358
5 10 PCT T	480	.216	9.96	80	10.228	6491	33	279	15	.057	1.9	16	.9	7.5	911
6 25 PCT T	490	.209	10.30	250	10.557	8255	41	322	59	.077	3.2	25	4.6	18.6	358
7 90 PCT T	2272	1.157	8.71	810	10.115	20820	510	1811	509	.113	57.7	599	57.0	65.2	53
8 25 PCT T	416	.136	9.96	275	10.192	7666	39	208	63	.077	2.6	16	4.8	18.6	358
9 C.T.	3200	.020	.15	10	.991	0	0	0	0	.193	0.0	0	0.0	0.0	597

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	BSFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 I		17.6	0.0	0	3.1	R	R	.030	R	570	33.8	6.5	1.1	.2	4.4	0.0
2 25		19.1	29.2	63	18.1	.799	2.0	.047	.956	2020	21.2	4.3	3.0	3.4	8.5	7.2
3 55		7.0	59.0	190	28.9	.535	4.3	.050	.326	2030	19.9	15.6	7.7	36	25.8	30.5
4 25		19.1	29.9	65	17.9	.719	2.5	.048	.938	2020	20.7	3.5	3.3	4..	8.4	7.4
5 10		16.2	10.1	26	19.2	1.905	1.5	.047	.859	2020	21.4	2.0	2.2	.8	4.4	2.2
6 25		19.1	29.9	65	18.2	.731	2.4	.048	.995	2020	20.7	3.4	3.5	4.2	8.5	7.4
7 90		2.1	87.5	226	95.9	.525	5.8	.047	.319	2030	21.3	61.4	77.0	52.1	31.6	38.0
8 25		19.1	29.9	65	16.9	.678	2.6	.046	.913	2020	21.5	2.8	2.3	4.4	7.4	7.4
9 CT		23.5	0.0	0	0.0	1	I	.002	I	2020	425.5	0.0	0.0	0.0	0.0	0.0
1 I		17.6	0.0	0	3.1	R	R	.030	R	570	33.8	6.5	1.1	.2	4.4	0.0
2 25		19.1	29.2	63	18.1	.799	2.0	.047	.956	2020	21.2	4.3	3.0	3.4	8.5	7.2
3 55		7.0	59.0	190	28.9	.535	4.3	.050	.326	2030	19.9	15.6	7.7	30.5	25.8	30.5
4 25		19.1	29.9	65	17.9	.719	2.5	.048	.938	2020	20.7	3.5	3.3	4.3	8.4	7.4
5 10		16.2	10.1	26	19.2	1.905	1.5	.047	.859	2020	21.4	2.0	2.2	.8	4.4	2.2
6 25		19.1	29.9	65	18.2	.731	2.4	.048	.995	2020	20.7	3.4	3.5	4.2	8.5	7.4
7 90		2.1	87.5	226	95.9	.525	5.8	.047	.319	2030	21.3	61.4	77.0	52.1	31.6	38.0
8 25		19.1	29.9	65	16.9	.678	2.6	.046	.913	2020	21.5	2.8	2.3	4.4	7.4	7.4
9 CT		23.5	0.0	0	0.0	1	I	.002	I	2020	425.5	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------				4.4	37	5.7
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------				4.4	37	5.7
TWO CYCLE COMPOSITE -	HC- FID 0.35(	4.4) + 0.65(	4.4) =	4.858	G/KW HR	(3.622 BS)
	CO- NDIR 0.35(	36.8) + 0.65(	36.8) =	36.833	G/KW HR	(27.466 BS)
	NOX-CL 0.35(	5.7) + 0.65(	5.7) =	5.702	G/KW HR	(4.252 BS)
			HC + NOX =	10.559	G/KW HR	(7.879 BS)
			BFC =	.385	KG/KW HR	(.632 BS)

ID =

TABLE F-19. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-263 RUN-09 10-25-76 SAMPLED FROM SIDE WITH AI DISCONNECTED K= .929 HUM= 7.9 G/KG

MODE		CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE		576	.159	13.07	53	13.293	1633	8	39	2	.232	1.8	9	.5	0.0	999
2 25 PCT T		900	.193	14.39	360	14.628	8396	26	222	63	.077	2.0	17	4.9	18.0	358
3 55 PCT T		980	.997	14.70	730	15.252	13109	97	863	193	.147	6.9	127	28.9	90.2	178
4 25 PCT T		200	.131	14.59	510	14.699	7893	12	192	84	.077	.9	11	6.5	18.6	358
5 10 PCT T		900	.997	14.70	190	15.293	6532	20	930	19	.057	1.1	25	1.1	7.6	911
6 25 PCT T		229	.159	14.59	500	14.729	8210	19	179	86	.077	1.1	19	6.6	18.6	358
7 90 PCT T		1589	3.260	12.52	900	15.962	20689	235	8533	360	.113	26.6	969	40.6	65.9	53
8 25 PCT T		229	.170	14.86	590	15.055	7711	13	176	85	.077	1.0	14	6.6	18.6	358
9 C.T.		5990	.020	.15	10	.715	0	0	0	0	.143	0.0	0	0.0	0.0	599
1 IDLE		1088	.159	12.93	97	13.211	1633	15	90	2	.232	3.5	9	.9	0.0	999
2 25 PCT T		900	.170	14.23	900	14.995	8210	26	195	70	.077	2.0	15	5.9	18.0	358
3 55 PCT T		629	.598	14.59	750	15.209	13109	61	1091	199	.147	9.0	153	29.3	90.3	178
4 25 PCT T		229	.136	14.59	530	14.702	7893	14	198	88	.077	1.1	11	6.8	18.6	358
5 10 PCT T		336	.389	14.86	160	15.287	6532	16	335	21	.057	.9	19	1.2	7.6	909
6 25 PCT T		272	.216	14.59	520	14.787	8210	17	292	89	.077	1.3	19	6.9	18.6	358
7 90 PCT T		1929	3.210	12.38	990	15.753	20593	213	8976	379	.113	24.1	958	42.8	65.5	53
8 25 PCT T		290	.209	14.70	530	14.931	7711	14	213	84	.077	1.1	16	6.5	18.7	358
9 C.T.		5120	.015	.15	10	.678	0	0	0	0	.143	0.0	0	0.0	0.0	599

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I		17.5	0.0	0	3.6	R	R	.060	R	620	16.7	9.9	.8	.5	5.1	0.0
2 2S		19.1	29.1	63	18.9	.763	2.7	.066	.969	2020	15.2	9.8	1.9	5.1	8.6	7.1
3 5S		7.0	59.0	190	28.9	.536	3.6	.068	.326	2030	19.6	16.7	10.7	29.9	25.7	30.5
4 2S		19.1	29.9	65	17.9	.699	3.9	.066	.925	2020	15.2	2.3	.9	6.8	8.1	7.9
5 10		16.2	10.1	26	19.9	1.921	1.9	.068	.869	2020	19.6	2.7	2.1	1.1	5.0	2.2
6 2S		19.1	29.9	65	18.1	.726	3.5	.066	.991	2020	15.1	2.6	1.2	7.0	8.9	7.9
7 90		2.1	87.7	227	95.6	.520	9.2	.073	.316	2030	13.6	69.1	81.7	92.7	31.2	38.1
8 2S		19.1	29.9	65	17.0	.682	3.5	.067	.915	2020	19.8	2.9	1.1	6.9	7.9	7.9
9 CT		23.9	0.0	0	0.0	I	I	.003	I	2020	291.3	0.0	0.0	0.0	0.0	0.0
1 I		17.5	0.0	0	3.6	R	R	.060	R	620	16.7	8.1	.8	.9	5.1	0.0
2 2S		19.1	29.2	63	18.1	.748	2.9	.065	.955	2020	15.9	9.6	1.3	5.9	8.5	7.1
3 5S		7.0	59.1	190	28.9	.539	3.7	.068	.325	2030	19.6	21.0	12.8	29.5	25.8	30.5
4 2S		19.1	25.0	65	17.9	.697	3.6	.066	.929	2020	15.2	2.9	.9	6.8	8.1	7.9
5 10		16.1	10.2	26	19.9	1.919	2.1	.069	.863	2020	19.6	2.2	1.6	1.2	5.0	2.2
6 2S		19.1	25.0	65	18.1	.729	3.6	.066	.991	2020	15.1	3.1	1.6	6.9	8.5	7.9
7 90		2.1	87.9	227	95.9	.517	9.9	.072	.319	2030	13.8	56.0	79.8	93.1	31.1	38.1
8 2S		19.1	25.0	65	17.0	.680	3.9	.067	.913	2020	19.9	2.5	1.9	6.5	7.9	7.9
9 CT		23.9	0.0	0	0.0	I	I	.003	I	2020	307.9	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 2.2 62 5.0

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 2.2 63 5.2

TWO CYCLE COMPOSITE - HC- FID 0.35(2.2) + 0.65(2.2) = 2.213 G/KW HR (1.650 BS)

CO- NDIR 0.35(61.5) + 0.65(62.6) = 62.239 G/KW HR (46.408 BS)

NOX-CL 0.35(5.0) + 0.65(5.2) = 5.101 G/KW HR (3.804 BS)

HC + NOX = 7.314 G/KW HR (5.454 BS)

SFC = .385 KG/KW HR (.632 BS)

ID =

TABLE F-20. STEADY STATE EMISSIONS BY EPA PROCEDURE - METRIC UNITS
1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-263 RUN-HOT 10-25-76 EFI-TR-EGR-HEI 168-HAI-275ECU AUTO SYS K= .950 HUM= 8.7 G/KG

MODE	RPM	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL CONS.	CALCULATED G/HR HC	CO	NO2	CORRECTED G/HR HC-FID	CO	NOx-CL	CRW	VAC. MM
1	2030	50	.997	13.78	907	14.283	23133	9	1626	988	9.2	1626	963.9	75.0	0
2	2030	95	.376	14.59	980	14.921	22725	8	1155	996	7.8	1155	970.8	74.5	0

MODE	ID	-------UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE------- HV	CHP	CTQ	FC	BSHC	BSCO	BSNOX	BSFC	---CALC--- A/F	F/A	-------G/KW HR------ HC	CO	NOx	SFC KG/KW HR
1		.3	100.6	260	51.0	.09	16.37	9.91	.507	15.5	.064	.12	21.95	6.58	.309
2		.3	99.9	258	50.1	.08	11.68	5.01	.502	14.9	.067	.11	15.66	6.72	.305

ID =

TABLE F-21. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-2 TEST-264 RUN-1 EFI-TR-AEGR-HEI 168HVA-WAI-275ECU

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	442	1.8	27.1	889	.056	7.86	25
2	1200	8.1	1	384	4.7	18.2	133	.136	11.99	28
3	1200	24.4	3	373	4.8	17.6	22	.030	12.52	31
4	1200	56.9	7	353	5.1	18.3	56	.275	11.73	47
5	1200	78.6	10	340	5.3	18.7	166	.583	11.12	77
6	1200	160.0	20	249	6.8	20.3	290	.120	10.64	930
7	1200	238.6	30	79	11.3	15.8	18	.005	14.08	370
8	1200	260.3	33	61	12.0	15.5	14	.010	14.39	450
9	1200	292.9	37	46	12.5	15.6	15	.010	14.23	750
10	1200	322.7	41	5	14.0	15.3	16	.046	14.54	765
11	600	0.0	0	444	1.8	27.1	644	.072	7.86	31
12	1200	0.0	0	584	0.0	559.4	2882	.005	.08	2
13	2300	352.5	85	8	26.1	15.3	19	.193	14.39	1265
14	2300	322.7	78	38	23.9	15.6	12	.040	14.23	1242
15	2300	284.7	69	56	22.4	15.2	11	.104	14.54	660
16	2300	260.3	63	76	21.0	15.6	12	.025	14.23	640
17	2300	176.3	42	183	14.8	18.4	16	.030	11.99	750
18	2300	86.8	21	325	10.7	17.8	14	.025	12.38	128
19	2300	61.0	15	394	8.2	21.0	36	.109	10.30	220
20	2300	27.1	7	427	7.1	21.4	44	.125	10.07	98
21	2300	9.5	2	439	6.5	21.9	56	.125	9.86	73
22	600	0.0	0	442	1.8	27.0	739	.082	7.86	37
23	2300	0.0	0	610	0.0	664.9	2242	.010	.08	1

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	14.0	25	1.8	.070	0	3.9	R	R	R
2	5.1	106	3.6	.060	6	10.3	5.02	103.7	3.5
3	.9	23	3.9	.060	18	10.6	.28	7.6	1.3
4	2.3	235	6.6	.050	42	11.2	.33	32.9	.9
5	7.5	534	11.6	.030	58	11.7	.96	54.0	1.2
6	18.3	153	194.7	.060	118	15.0	.91	7.6	9.7
7	1.2	8	98.5	0.000	176	24.9	.04	.3	3.3
8	1.1	17	124.7	.040	192	26.5	.03	.5	3.8
9	1.3	18	218.9	0.000	216	27.6	.04	.5	5.9
10	1.4	88	243.2	0.000	238	30.8	.03	2.2	6.0
11	14.6	33	2.3	.070	0	4.0	R	R	R
12	0.0	0	0.0	.120	0	0.0	I	I	I
13	3.5	696	751.1	.025	260	57.5	.04	8.2	8.8
14	2.1	137	690.7	.055	238	52.7	.03	1.8	8.9
15	1.7	321	335.3	.035	210	49.4	.03	4.7	4.9
16	1.8	75	313.0	.060	192	46.3	.03	1.2	5.0
17	1.9	76	307.2	.060	130	32.7	.05	1.8	7.2
18	1.2	44	36.5	0.000	64	23.5	.06	2.1	1.7
19	2.8	173	57.3	.065	45	18.0	.19	11.8	3.9
20	3.0	176	22.6	0.000	20	15.6	.46	26.9	3.5
21	3.6	166	15.8	0.000	7	14.4	1.59	72.4	6.9
22	16.7	38	2.8	.080	0	4.0	R	R	R
23	0.0	0	0.0	.060	0	0.0	I	I	I

CYCLE COMPOSITE	HC	.319	GRAM/ KW HR	(.238 BS)
	CO	5.589	GRAM/ KW HR	(4.168 BS)
	NOX	6.559	GRAM/ KW HR	(4.891 BS)
	SFC	.395	KG/ KW HR	(.650 BS)
CORRECTED	NOX	5.989	GRAM/ KW HR	(4.466 BS)

TABLE F-22. MASS EMISSIONS BY 23 MODE PROCEDURE
ENGINE-2 TEST-264 RUN-2 EFI-TR-AEGR-HEI 168MVA-WAI-27SECU

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	600	0.0	0	442	1.8	27.1	784	.067	7.86	28
2	1200	6.8	1	384	4.6	18.7	266	.136	11.61	28
3	1200	27.1	3	373	4.8	18.6	29	.093	11.73	35
4	1200	54.9	7	353	4.9	19.0	55	.312	11.24	49
5	1200	81.3	10	340	5.4	19.1	144	.598	10.88	78
6	1200	162.7	20	239	6.8	20.5	272	.142	10.53	440
7	1200	244.0	31	74	11.0	15.8	12	.025	14.08	355
8	1200	265.7	33	53	11.9	15.8	10	.030	14.08	460
9	1200	298.3	37	41	12.5	15.9	10	.030	13.93	750
10	1200	325.4	41	5	13.8	15.6	10	.077	14.23	710
11	600	0.0	0	447	1.7	27.4	661	.072	7.77	32
12	1200	0.0	0	579	0.0	559.4	2982	.005	.08	3
13	2300	352.5	85	8	26.0	15.4	16	.251	14.23	1225
14	2300	322.7	78	36	23.8	15.9	3	.035	13.93	1350
15	2300	290.1	70	56	22.5	15.7	2	.104	14.08	720
16	2300	263.0	63	76	21.0	15.8	2	.025	14.08	430
17	2300	176.3	42	180	15.0	18.6	3	.025	11.86	720
18	2300	89.5	22	323	10.6	18.2	3	.025	12.12	128
19	2300	62.4	15	389	8.5	21.2	22	.109	10.19	223
20	2300	29.8	7	422	7.1	21.9	39	.125	9.86	98
21	2300	9.5	2	439	6.5	22.3	99	.125	9.64	68
22	600	0.0	0	442	1.6	27.6	789	.077	7.68	35
23	2300	0.0	0	610	0.0	720.6	2050	.005	.08	1

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	17.3	30	2.1	.070	0	3.9	R	R	R
2	10.4	107	3.6	.060	5	10.1	12.15	125.9	4.2
3	1.2	76	4.7	.060	20	10.5	.34	22.2	1.4
4	2.4	270	7.0	.050	42	10.9	.33	37.7	1.0
5	6.7	563	12.1	.030	60	11.8	.66	55.1	1.2
6	17.3	182	198.5	.060	120	15.0	.85	8.9	9.7
7	1.0	40	91.7	0.000	180	24.2	.03	1.3	3.0
8	.9	52	129.1	.040	196	26.3	.03	1.5	3.9
9	.6	55	223.3	0.000	220	27.6	.02	1.5	6.0
10	1.0	150	227.2	0.000	240	30.4	.02	3.7	5.6
11	14.0	31	2.3	.090	0	3.7	R	R	R
12	0.0	0	0.0	.120	0	0.0	I	I	I
13	2.9	912	731.2	.025	260	57.4	.03	10.7	8.6
14	.6	122	762.8	.055	238	52.4	.01	1.6	9.8
15	.4	333	379.9	.035	214	49.7	.01	4.8	5.4
16	.3	76	312.1	.060	194	46.4	.01	1.2	4.9
17	.4	64	301.1	.060	130	33.0	.01	1.5	7.1
18	.3	44	37.1	0.000	66	23.4	.01	2.1	1.7
19	1.8	181	61.0	.065	46	18.7	.12	12.1	4.1
20	2.6	181	23.2	0.000	22	15.7	.37	25.1	3.2
21	3.3	169	15.1	0.000	7	14.4	1.43	74.1	6.6
22	16.0	32	2.4	.080	0	3.5	R	R	R
23	0.0	0	0.0	.060	0	0.0	I	I	I

CYCLE COMPOSITE	HC	.297	GRAM/ KW HR	(.221 BS)
	CO	6.231	GRAM/ KW HR	(4.646 BS)
	NOX	6.771	GRAM/ KW HR	(5.049 BS)
	SFC	.391	KG/ KW HR	(.643 BS)
CORRECTED	NOX	6.368	GRAM/ KW HR	(4.749 BS)

TABLE F-23. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

ENGINE-2 TEST-265 RUN-01 10-22-76 EFI-TR-EGR-HEI 16BNVA-MAI-275ECU AUTO SYS K= .965 HUM= 9.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	520	.088	8.23	39	8.379	1769	12	37	2	.232	2.7	9	.5	0.0	937
2 25 PCT T	136	.169	10.53	260	10.709	8210	11	254	69	.077	.9	20	5.9	17.8	361
3 55 PCT T	21	.088	12.38	590	12.470	13200	2	187	200	.147	.9	28	29.9	39.3	178
4 25 PCT T	96	.131	10.69	290	10.776	7983	9	196	69	.077	.3	15	5.3	17.8	361
5 10 PCT T	65	.176	10.53	70	10.713	6713	9	222	19	.057	.3	13	.8	6.9	917
6 25 PCT T	97	.176	10.69	290	10.821	8301	9	272	71	.077	.3	21	5.5	17.8	361
7 90 PCT T	17	.227	14.70	530	14.929	20593	3	639	239	.113	.3	72	26.5	69.2	53
8 25 PCT T	23	.093	10.88	290	10.976	7711	2	132	65	.077	.1	10	5.0	17.9	361
9 C.T.	3200	.005	.11	8	.935	0	0	0	0	.143	0.0	0	0.0	0.0	597
1 IDLE	896	.077	7.86	28	8.033	1729	21	33	2	.232	9.8	8	.9	0.0	939
2 25 PCT T	298	.149	10.53	215	10.721	8301	21	257	53	.077	1.6	20	9.1	17.9	361
3 55 PCT T	93	.093	12.12	550	12.218	13109	5	202	189	.147	.8	30	27.8	39.3	178
4 25 PCT T	69	.136	10.76	275	10.909	7938	6	201	69	.077	.9	15	9.9	17.8	361
5 10 PCT T	79	.176	10.30	75	10.489	6668	6	225	15	.057	.3	13	.9	6.9	917
6 25 PCT T	69	.142	10.53	290	10.679	8210	6	220	71	.077	.9	17	5.5	17.8	361
7 90 PCT T	22	.170	14.70	685	14.872	20775	3	479	307	.113	.9	54	34.6	69.2	53
8 25 PCT T	29	.093	11.00	280	11.096	7756	2	131	63	.077	.1	10	9.8	17.9	361
9 C.T.	3520	.005	.11	16	.967	0	0	0	0	.143	0.0	0	0.0	0.0	599

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	HSFC	BSNOx	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 I		17.2	0.0	0	3.9	R	R	.039	R	600	25.9	52.0	9.7	.7	5.9	0.0
2 25		19.2	23.9	62	18.1	.756	2.7	.099	.960	2020	20.5	16.7	10.5	6.3	8.9	7.3
3 55		7.0	52.7	136	29.1	.552	3.8	.056	.336	2030	17.7	6.9	19.8	37.7	25.7	30.5
4 25		19.2	23.9	62	17.6	.735	2.9	.099	.997	2020	20.3	5.5	8.1	6.8	8.2	7.3
5 10		16.9	9.3	24	19.8	1.598	1.5	.099	.972	2020	20.5	9.8	6.8	1.0	5.1	2.1
6 25		19.2	23.9	62	18.3	.765	3.0	.099	.965	2020	20.3	5.8	11.2	7.0	8.5	7.3
7 90		2.1	86.1	223	95.9	.527	2.7	.067	.321	2030	19.9	5.7	38.9	39.0	30.9	38.3
8 25		19.2	24.0	62	17.0	.710	2.7	.050	.932	2020	20.0	2.6	5.5	6.9	7.9	7.3
9 CT		23.5	0.0	0	0.0	I	I	.002	I	2020	979.5	0.0	0.0	0.0	0.0	0.0
1 I		17.3	0.0	0	3.8	R	R	.037	R	600	27.0	53.8	9.6	.5	5.3	0.0
2 25		19.2	24.0	62	18.3	.764	2.2	.099	.965	2020	20.9	18.3	11.9	9.9	8.5	7.3
3 55		7.0	52.8	136	28.9	.598	3.6	.055	.333	2030	18.1	8.5	17.8	33.9	25.6	30.5
4 25		19.2	23.9	62	17.5	.731	2.7	.050	.995	2020	20.1	9.8	9.3	5.9	8.1	7.3
5 10		16.9	9.3	24	19.7	1.587	1.7	.098	.965	2020	20.9	3.5	7.7	1.0	5.0	2.1
6 25		19.2	23.9	62	18.1	.756	3.0	.099	.960	2020	20.5	5.0	10.2	6.6	8.9	7.3
7 90		2.1	86.1	223	95.8	.532	3.6	.067	.329	2030	15.0	9.9	32.5	41.7	31.2	38.3
8 25		19.2	24.0	62	17.1	.719	2.6	.051	.939	2020	19.8	1.6	6.1	5.8	7.9	7.3
9 CT		23.9	0.0	0	0.0	I	I	.002	I	2020	996.5	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 10 9.1

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .5 9 9.9

TWO CYCLE COMPOSITE - HC- FID 0.35(.3) + 0.65(.5) = .909 G/KW HR (.302 BS)

CO- NDIR 0.35(9.9) + 0.65(8.8) = 9.200 G/KW HR (6.861 BS)

NOx-CL 0.35(9.1) + 0.65(9.4) = 9.310 G/KW HR (3.219 BS)

HC + NOX = 9.715 G/KW HR (3.516 BS)

SFC = .398 KG/KW HR (.655 BS)

ID =

TABLE F-24. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

ENGINE-2 TEST-265 RUN-02 10-27-76 EFI-TR-EGR-HEI 14RMVA-WAI-275ECU AUTO SYS K= .981 HUM= 9.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	608	.082	8.09	31	8.188	1678	13	39	2	.232	3.1	8	.5	0.0	937
2 25 PCT T	190	.170	10.53	215	10.715	8301	12	266	59	.077	.9	20	4.2	17.8	361
3 55 PCT T	15	.093	12.25	580	12.395	13200	2	201	202	.197	.3	30	29.7	39.2	178
4 25 PCT T	92	.192	11.29	240	11.387	7893	3	199	59	.077	.2	15	4.2	17.8	361
5 10 PCT T	53	.176	10.53	70	10.711	6577	4	218	19	.057	.2	12	.8	6.9	917
6 25 PCT T	95	.197	10.53	280	10.682	8210	4	229	70	.077	.3	18	5.4	17.8	361
7 90 PCT T	8	.275	14.54	615	14.814	20820	1	781	282	.113	.1	88	31.8	64.1	53
8 25 PCT T	12	.098	10.53	315	10.630	7756	1	195	75	.077	.1	11	5.8	17.8	361
9 C.T.	3200	.010	.15	16	.480	0	0	0	0	.193	0.0	0	0.0	0.0	599
1 IDLE	896	.088	8.14	30	8.329	1678	14	36	2	.232	4.5	8	.5	0.0	937
2 25 PCT T	209	.181	10.53	220	10.739	8396	17	285	56	.077	1.3	22	4.3	17.8	361
3 55 PCT T	38	.093	12.25	560	12.397	13159	5	200	199	.197	.7	29	28.6	39.2	178
4 25 PCT T	58	.136	10.64	280	10.783	7938	5	203	67	.077	.4	16	5.2	17.8	361
5 10 PCT T	57	.169	10.53	80	10.700	6622	4	205	16	.057	.2	12	.9	6.9	917
6 25 PCT T	94	.197	10.74	280	10.912	8301	4	227	69	.077	.3	17	5.3	17.8	361
7 90 PCT T	16	.281	14.70	610	14.983	20845	3	791	277	.113	.3	89	31.3	64.1	53
8 25 PCT T	18	.093	10.74	305	10.855	7802	1	135	71	.077	.1	10	5.5	17.8	361
9 C.T.	3528	.010	.11	16	.472	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CMP	CTQ	FC	RSFC	RSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I		17.2	0.0	0	3.7	R	R	.038	R	600	26.5	59.2	3.9	.6	5.2	0.0
2 25		19.2	23.9	62	18.3	.766	2.3	.049	.966	2020	20.9	17.5	10.1	5.1	8.5	7.3
3 55		7.0	52.5	136	29.1	.559	3.8	.056	.337	2030	17.9	5.0	19.6	36.1	25.8	30.5
4 25		19.2	23.9	62	17.9	.729	2.3	.052	.999	2020	19.3	4.7	7.5	5.1	8.1	7.3
5 10		16.9	9.2	24	14.5	1.570	1.5	.049	.955	2020	20.5	3.9	6.1	1.0	5.0	2.1
6 25		19.2	23.9	62	18.1	.758	2.9	.049	.961	2020	20.5	5.6	8.7	6.6	8.9	7.3
7 90		2.1	85.9	222	95.9	.539	3.3	.066	.325	2030	15.0	2.8	93.6	38.7	31.2	38.9
8 25		19.2	23.9	62	17.1	.715	3.1	.048	.935	2020	20.6	1.9	5.5	7.0	7.9	7.3
9 CT		23.9	0.0	0	0.0	I	I	.002	I	2020	939.5	0.0	0.0	0.0	0.0	0.0
1 I		17.2	0.0	0	3.7	R	R	.038	R	600	26.0	58.0	4.1	.6	5.2	0.0
2 25		19.2	23.9	62	18.4	.770	2.3	.049	.969	2020	20.9	17.3	10.7	5.3	8.5	7.3
3 55		7.0	52.6	136	29.0	.551	3.7	.056	.335	2030	17.9	8.5	19.9	35.0	25.6	30.5
4 25		19.2	23.9	62	17.5	.733	2.8	.049	.996	2020	20.3	4.6	7.6	6.3	8.1	7.3
5 10		16.9	9.2	24	14.6	1.579	1.7	.049	.961	2020	20.5	2.8	5.7	1.1	5.0	2.1
6 25		19.2	23.9	62	18.3	.766	2.9	.050	.966	2020	20.1	3.6	8.5	6.6	8.5	7.3
7 90		2.1	86.0	223	96.0	.536	3.2	.067	.325	2030	14.9	3.7	93.8	38.9	31.2	38.9
8 25		19.2	23.9	62	17.2	.720	3.0	.049	.938	2020	20.2	1.9	5.1	6.7	8.0	7.3
9 CT		23.9	0.0	0	0.0	I	I	.002	I	2020	991.7	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 11 9.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 11 9.3

TWO CYCLE COMPOSITE -

HC- FID 0.35(.3) + 0.65(.9) = .365 G/KW HR (.273 BS)

CO- NDIR 0.35(10.7) + 0.65(10.8) = 10.797 G/KW HR (8.052 BS)

NOx-CL 0.35(9.3) + 0.65(9.3) = 9.337 G/KW HR (3.239 BS)

HC + NOX = 9.703 G/KW HR (3.507 BS)

SFC = .399 KG/KW HR (.657 BS)

ID =

TABLE F-25. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311
ENGINE-2 TEST-265 RUN-EGR 10-27-74 SAMPLE OF RECIRCULATED EXHAUST K= .939 HUM= 8.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	928	.056	6.17	14	4.329	1729	27	31	1	.232	6.2	7	.3	0.0	937
2 25 PCT T	672	.120	9.69	198	9.833	8255	62	209	52	.077	4.7	16	4.0	17.7	361
3 55 PCT T	880	.159	10.53	510	10.785	13200	118	392	199	.197	17.4	58	28.5	39.0	178
4 25 PCT T	560	.109	9.53	260	9.495	7893	50	171	66	.077	3.8	13	5.1	17.7	361
5 10 PCT T	980	.300	10.07	70	10.922	6991	33	379	13	.057	1.9	21	.8	6.9	917
6 25 PCT T	536	.115	9.69	250	9.813	8029	98	189	63	.077	3.7	15	4.9	17.7	361
7 90 PCT T	2080	1.178	8.91	670	10.315	20865	940	4811	920	.113	52.0	599	97.5	63.7	53
8 25 PCT T	504	.109	9.96	250	10.119	7756	92	161	59	.077	3.3	12	4.6	17.7	361
9 C.T.	3200	.010	.15	21	.980	0	0	0	0	.193	0.0	0	0.0	0.0	599
1 IDLE	1280	.061	5.99	13	4.136	1628	37	39	1	.232	8.6	8	.3	0.0	937
2 25 PCT T	704	.115	9.69	193	9.831	8255	69	199	50	.077	5.0	15	3.9	17.7	361
3 55 PCT T	888	.197	10.69	570	10.885	13295	119	363	215	.197	17.5	53	31.6	39.1	178
4 25 PCT T	540	.098	9.69	225	9.799	8119	51	165	71	.077	3.9	13	5.4	17.7	361
5 10 PCT T	964	.263	9.96	75	10.229	6532	32	338	15	.057	1.8	19	.8	6.9	917
6 25 PCT T	576	.109	9.69	295	9.806	8119	52	173	76	.077	4.0	13	5.8	17.7	361
7 90 PCT T	2080	1.178	8.81	680	10.215	20911	945	4869	932	.113	52.6	550	98.8	63.7	53
8 25 PCT T	528	.088	9.69	280	9.785	7756	96	140	69	.077	3.5	11	5.3	17.7	361
9 C.T.	3200	.005	.15	10	.975	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I		17.2	0.0	0	3.8	R	R	.029	R	600	35.0	6.7	1.0	.3	5.3	0.0
2 25		19.2	23.7	62	18.2	.767	2.2	.095	.967	2010	22.2	5.1	2.3	4.2	8.9	7.3
3 55		7.0	52.9	136	29.1	.556	3.7	.099	.338	2020	20.3	18.7	8.9	29.8	25.8	30.6
4 25		19.2	23.7	62	17.9	.733	2.8	.099	.996	2010	22.5	4.1	1.9	5.3	8.1	7.3
5 10		16.9	9.2	24	19.2	1.595	1.5	.098	.990	2010	21.0	2.0	3.1	.8	4.9	2.1
6 25		19.2	23.7	62	17.7	.745	2.7	.095	.953	2010	22.2	4.0	2.1	5.1	8.2	7.3
7 90		2.1	85.9	222	96.0	.539	4.9	.098	.328	2020	21.0	55.9	79.3	99.7	31.3	38.3
8 25		19.2	23.8	62	17.1	.719	2.5	.096	.938	2010	21.6	3.5	1.8	4.8	7.9	7.3
9 CT		23.9	0.0	0	0.0	I	I	.002	I	2010	939.5	0.0	0.0	0.0	0.0	0.0
1 I		17.2	0.0	0	3.7	R	R	.029	R	600	35.0	8.9	1.2	.3	5.2	0.0
2 25		19.2	23.8	62	18.2	.766	2.1	.095	.966	2010	22.2	5.1	2.2	3.8	8.9	7.3
3 55		7.0	52.9	136	29.2	.557	4.1	.050	.339	2020	20.1	18.0	7.8	31.0	25.8	30.6
4 25		19.2	23.8	62	17.9	.753	3.0	.095	.958	2010	22.3	4.0	1.9	5.3	8.3	7.3
5 10		16.9	9.2	24	19.9	1.569	1.6	.097	.951	2010	21.3	1.9	2.8	.8	4.9	2.1
6 25		19.2	23.8	62	17.9	.753	3.2	.095	.958	2010	22.3	4.1	2.0	5.7	8.3	7.3
7 90		2.1	85.5	222	96.1	.539	5.1	.097	.328	2020	21.2	54.3	80.6	97.9	31.3	38.3
8 25		19.2	23.8	62	17.1	.719	2.9	.095	.937	2010	22.3	3.6	1.6	5.2	7.9	7.3
9 CT		23.9	0.0	0	0.0	I	I	.002	I	2010	939.1	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- 5.0 37 5.1
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 5.2 36 5.9

TWO CYCLE COMPOSITE -

HC- FID	0.35(5.0) + 0.65(5.2) =	5.086	G/KW HR	(3.792 BB)
CO- NDIR	0.35(36.5) + 0.65(36.9) =	36.917	G/KW HR	(27.156 BB)
NOX-CL	0.35(5.1) + 0.65(5.9) =	5.312	G/KW HR	(3.961 BB)
	HC + NOX =	10.397	G/KW HR	(7.753 BB)
	SFC =	.901	KG/KW HR	(.660 BB)

ID =

APPENDIX G

SERVICE ACCUMULATION DEMONSTRATION RESULTS

G-1 Summary of the Results
G-2 through G-16 Computer Printouts for Optimized Engine
G-17 through G-24 Computer Printouts with Oxidation Catalyst

TABLE G-1. SERVICE ACCUMULATION DEMONSTRATION RESULTS

Test No.	Dur. Hours	Type Test	Description	GRAM/kW HR HC	CO	NO_x	$HC+NO_x$	KG/ kW HR SFC	Appendix Table
0	000	9-EPA	Optimized 350 CID Chevrolet Engine	0.290	10.366	3.736	4.026	.386	G-2
1	125	9-EPA	Optimized 350 CID Chevrolet Engine	0.421	12.669	3.524	3.944	.387	G-3
2	250	9-EPA	Optimized 350 CID Chevrolet Engine	0.327	16.307	3.271	3.598	.384	G-4
3	375	9-EPA	Optimized 350 CID Chevrolet Engine	0.463	14.460	3.538	4.002	.378	G-5
4	500	9-EPA	Optimized 350 CID Chev Pre-Maint	0.354	10.890	3.868	4.222	.399	G-6
5	500	9-EPA	Optimized 350 CID Chev Post Maint	0.523	8.404	3.937	4.460	.392	G-7
6	625	9-EPA	Optimized 350 CID Chevrolet Engine	0.364	14.530	3.587	3.951	.412	G-8
7	750	9-EPA	Optimized 350 CID Chevrolet Engine	0.396	23.332	2.636	3.032	.397	G-9
9	825	9-EPA	Optimized 350 CID Chev W/O Cat	0.418	17.211	3.059	3.477	.405	G-10
11	1000	9-EPA	Chev 350 CID W/O Cat Pre-Maint	0.333	27.553	2.826	3.159	.404	G-11
13	1000	9-EPA	Chev 350 CID W/O Cat Post Maint	0.317	12.595	3.293	3.610	.390	G-12
15	1125	9-EPA	Optimized 350 CID Chev W/O Cat	0.355	19.405	3.205	3.559	.389	G-13
17	1250	9-EPA	Optimized 350 CID Chev W/O Cat	0.390	9.985	3.622	4.012	.405	G-14
19	1375	9-EPA	Optimized 350 CID Chev W/O Cat	0.996	12.720	3.594	4.590	.399	G-15
21	1500	9-EPA	Optimized 350 CID Chev W/O Cat	0.357	14.430	3.529	3.886	.390	G-16
	Cat. Hours								
8	000	9-EPA	Optimized 350 CID Chev W Oxi Cat	0.069	20.155	1.751	1.820	.410	G-17
10	125	9-EPA	Optimized 350 CID Chev W Oxi Cat	0.072	19.282	1.696	1.768	.414	G-18
12	250	9-EPA	Chev 350 CID HD W/ Cat Pre-Maint	0.113	27.171	2.374	2.487	.408	G-19
14	250	9-EPA	Chev 350 CID HD W/ Cat Post Maint	0.043	7.751	1.982	2.024	.396	G-20
16	375	9-EPA	Optimized 350 CID Chev W/ Oxi Cat	0.073	18.497	2.637	2.709	.396	G-21
18	500	9-EPA	Optimized 350 CID Chev W/ Oxi Cat	0.077	9.158	2.447	2.524	.398	G-22
20	625	9-EPA	Optimized 350 CID Chev W/ Oxi Cat	0.080	13.494	2.154	2.234	.409	G-23
22	750	9-EPA	Optimized 350 CID Chev W/ Oxi Cat	0.075	15.494	2.499	2.575	.402	G-24

TABLE G-2. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

12-07-76 1536 PM TEST 0-6 000 DUR HRS OPTIMIZED 350 CID CHEVROLET HD GAS ENGINE K= .833 HUM= 9.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	MT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	348	.117	8.55	28	8.709	2127	10	59	2	.232	2.9	14	.9	0.0	997
2 25 PCT T	117	.239	11.72	245	11.971	8255	9	332	97	.077	.7	26	3.6	18.8	393
3 55 PCT T	19	.080	12.80	715	12.882	12655	2	159	199	.197	.2	23	28.6	90.2	173
4 25 PCT T	29	.159	12.07	171	12.227	8029	2	204	31	.077	.1	16	2.9	17.0	351
5 10 PCT T	26	.123	12.01	62	12.134	6259	2	139	10	.057	.1	8	.5	7.2	399
6 25 PCT T	27	.160	12.07	207	12.233	8255	2	218	39	.077	.2	17	3.0	18.5	393
7 90 PCT T	17	.299	14.73	775	15.026	19913	3	788	289	.113	.3	89	32.1	63.8	53
8 25 PCT T	20	.077	12.19	188	12.270	8119	1	103	39	.077	.1	8	2.6	17.9	398
9 C.T.	9800	.017	.13	5	.428	0	0	0	0	.193	0.0	0	0.0	0.0	589
1 IDLE	968	.091	8.92	29	8.615	10089	13	23	1	.232	3.1	5	.2	0.0	999
2 25 PCT T	172	.323	11.48	233	11.992	8210	13	998	99	.077	1.0	35	3.9	18.6	395
3 55 PCT T	51	.069	12.88	615	12.878	12610	6	136	167	.197	.8	20	29.5	39.1	175
4 25 PCT T	52	.159	11.95	206	12.115	8119	9	216	38	.077	.3	17	2.9	18.1	398
5 10 PCT T	99	.139	11.95	60	12.095	6259	3	157	9	.057	.2	9	.5	7.6	396
6 25 PCT T	99	.167	12.07	209	12.292	8255	3	228	39	.077	.3	18	3.0	18.5	393
7 90 PCT T	28	.289	14.73	770	15.022	19913	9	774	282	.113	.5	87	31.9	63.8	53
8 25 PCT T	29	.050	12.07	239	12.129	8210	2	69	95	.077	.2	5	3.9	18.5	393
9 C.T.	9599	.013	.17	6	.438	0	0	0	0	.193	0.0	0	0.0	0.0	597

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- KW	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	17.6	0.0	0	9.8	R	R	.050	R	665	29.9	58.8	6.8	.6	6.7	0.0
2 25	13.5	25.2	64	18.2	.721	1.9	.059	.938	2020	18.9	16.7	12.8	9.9	8.5	7.6
3 55	6.8	58.9	198	27.9	.518	3.6	.058	.315	2015	17.2	5.5	11.7	39.0	29.7	31.0
4 25	13.8	22.7	59	17.8	.783	1.9	.055	.936	2020	18.0	3.3	7.9	3.3	8.3	6.9
5 10	15.7	9.6	25	19.9	1.596	1.0	.055	.991	2025	18.2	2.2	3.9	.7	5.1	2.1
6 25	13.5	29.9	66	18.2	.732	1.6	.055	.995	2025	18.0	3.8	8.9	9.1	8.5	7.5
7 90	2.1	85.6	229	93.9	.513	3.3	.067	.312	2010	19.8	7.0	99.5	93.8	29.9	37.9
8 25	13.7	23.3	61	17.9	.767	1.5	.056	.967	2025	18.0	2.7	9.0	3.6	8.3	7.0
9 CT	23.2	0.0	0	0.0	I	I	.003	I	2015	331.8	0.0	0.0	0.0	0.0	0.0
1 I	17.5	0.0	0	2.9	R	R	.050	R	640	25.2	98.9	2.8	.3	3.5	0.0
2 25	13.6	29.9	66	18.1	.727	1.8	.059	.992	2025	18.9	16.1	17.6	9.9	8.7	7.5
3 55	6.9	52.9	137	27.8	.531	3.2	.058	.323	2015	17.2	13.1	10.2	35.0	25.5	30.1
4 25	13.7	29.3	63	17.9	.736	1.6	.055	.998	2025	18.2	9.8	8.5	9.2	8.6	7.3
5 10	15.6	10.1	26	19.9	1.969	.9	.055	.899	2025	18.2	2.8	9.6	.8	5.3	2.3
6 25	13.5	29.9	66	18.2	.732	1.6	.055	.995	2025	18.0	9.1	9.0	9.3	8.7	7.5
7 90	2.1	85.5	223	93.9	.513	3.3	.067	.312	2010	19.8	7.6	99.7	95.6	31.0	37.8
8 25	13.5	29.9	65	18.1	.728	1.8	.055	.993	2025	18.2	2.7	2.7	9.9	8.7	7.5
9 CT	23.5	0.0	0	0.0	I	I	.003	I	2015	326.8	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .2 11 3.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .3 10 3.7

TWO CYCLE COMPOSITE -

HC- FID	0.35(	.2) + 0.65(	.3) =	.290	G/KW HR	(.216 88)
CO- NDIR	0.35(	10.5) + 0.65(	10.3) =	10.366	G/KW HR	(7.730 88)
NOx-CL	0.35(	3.9) + 0.65(	3.7) =	3.736	G/KW HR	(2.786 88)
			HC + NOX =	4.026	G/KW HR	(3.002 88)
			SFC =	.386	KG/KW HR	(.439 88)

TABLE G-3. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

12-19-76 1227 PM TEST 1-1 125 DUR HRS OPTIMIZED 350 CID CHEVROLET HD GAS ENGINE K= .875 HUM= 6.2 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOx-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	608	.118	8.75	25	8.939	1633	12	93	1	.232	2.8	18	.3	0.0	939
2 25 PCT T	265	.261	11.79	174	12.081	8391	20	367	36	.077	1.6	28	2.8	19.9	328
3 55 PCT T	97	.109	12.68	605	12.799	12297	5	211	168	.197	.7	31	29.7	39.1	180
4 25 PCT T	55	.180	11.89	193	12.026	8165	4	296	36	.077	.3	19	2.8	18.2	393
5 10 PCT T	59	.165	11.72	55	11.891	6622	4	186	9	.057	.2	11	.5	7.1	399
6 25 PCT T	53	.181	11.95	149	12.137	8079	4	299	32	.077	.3	19	2.9	17.5	393
7 90 PCT T	39	.920	19.93	692	15.359	19913	5	1101	257	.113	.6	129	29.0	69.0	53
8 25 PCT T	38	.087	12.19	198	12.281	7983	3	119	28	.077	.2	9	2.2	16.7	398
9 C.T.	9229	.012	.11	5	.594	0	0	0	0	.193	0.0	0	0.0	0.0	592
1 IDLE	832	.081	8.79	99	8.961	1633	16	30	3	.232	3.8	7	.6	0.0	939
2 25 PCT T	220	.395	11.60	156	11.969	8210	17	978	31	.077	1.3	37	2.9	18.3	393
3 55 PCT T	91	.092	12.80	580	12.903	12383	10	179	142	.197	1.9	26	23.3	39.1	180
4 25 PCT T	98	.168	11.95	165	12.129	8029	7	229	32	.077	.6	17	2.9	17.5	398
5 10 PCT T	67	.139	11.95	55	12.096	6622	4	159	9	.057	.2	9	.5	7.1	399
6 25 PCT T	45	.167	11.95	162	12.125	7938	5	221	31	.077	.9	17	2.9	17.1	393
7 90 PCT T	41	.369	19.73	795	15.109	19958	6	985	286	.113	.7	111	32.3	69.7	51
8 25 PCT T	96	.094	11.83	239	11.929	7938	3	126	95	.077	.3	10	3.5	17.9	398
9 C.T.	9916	.005	.10	5	.597	0	0	0	0	.193	0.0	0	0.0	0.0	592

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CTQ	FC	HSFC	NSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 I	17.1	0.0	0	3.6	R	R	.091	R	600	29.3	91.5	9.0	.6	5.2	0.0
2 25	12.9	26.1	68	18.5	.710	1.9	.055	.932	2000	18.2	23.5	11.3	6.3	8.8	7.9
3 55	7.1	52.5	138	27.0	.519	3.2	.058	.313	2000	17.3	11.0	12.9	38.2	29.6	30.9
4 25	13.5	29.5	69	18.0	.736	1.5	.055	.997	2000	18.3	9.8	7.6	9.3	8.6	7.9
5 10	15.7	9.5	25	19.6	1.539	.9	.059	.936	2000	18.5	3.1	9.2	.8	5.2	2.1
6 25	13.5	23.5	62	17.8	.758	1.3	.055	.961	2000	18.2	9.5	7.5	3.8	8.5	7.1
7 90	2.1	85.8	225	93.9	.512	3.0	.069	.311	2000	19.5	8.5	99.6	99.9	30.7	38.2
8 25	13.7	22.5	59	17.6	.789	1.2	.056	.977	2000	18.0	3.2	3.5	3.3	8.9	6.8
9 CT	23.3	0.0	0	0.0	I	I	.003	I	2000	383.1	0.0	0.0	0.0	0.0	0.0
1 I	17.3	0.0	0	3.6	R	R	.091	R	600	29.3	99.0	3.0	.9	5.2	0.0
2 25	13.5	29.5	69	18.1	.739	1.3	.059	.999	2000	18.9	19.9	15.7	3.5	8.7	7.9
3 55	7.1	52.9	138	27.3	.521	3.1	.058	.317	2000	17.2	16.6	11.3	35.0	29.9	30.9
4 25	13.7	23.5	62	17.7	.755	1.3	.055	.959	2000	18.2	6.9	7.9	3.6	8.5	7.1
5 10	15.7	9.5	25	19.4	1.590	.9	.055	.937	2000	18.2	2.7	3.7	.7	5.2	2.1
6 25	13.5	23.0	60	17.5	.762	1.3	.055	.963	2000	18.2	9.2	7.3	3.5	8.4	7.0
7 90	2.0	86.7	228	99.0	.507	3.3	.068	.309	2000	19.8	8.1	97.5	97.6	30.9	38.7
8 25	13.7	23.9	63	17.5	.731	1.9	.059	.999	2000	18.5	3.0	9.2	5.1	8.9	7.3
9 CT	23.3	0.0	0	0.0	I	I	.003	I	2000	381.0	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .9 13 3.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .5 12 3.6

TWO CYCLE COMPOSITE -

HC- FID 0.35(.9) + 0.65(.5) = .921 G/KW HR (.319 BS)

CO- NDIR 0.35(13.2) + 0.65(12.9) = 12.669 G/KW HR (9.997 BS)

NOX-CL 0.35(3.9) + 0.65(3.6) = 3.729 G/KW HR (2.628 BS)

HC + NOX = 3.999 G/KW HR (2.991 BS)

SFC = .387 KG/KW HR (.635 BS)

TABLE G-4. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

12 21 76 2125 PM TEST 2-2 250 DUR HRS OPTIMIZED 350 CID CHEVROLET HD GAS ENGINE K= .795 HUM= 3.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	616	.109	9.00	29	9.176	1997	11	36	1	.232	2.5	8	.2	0.0	999
2 25 PCT T	169	.231	11.60	222	11.899	8079	12	317	90	.077	1.0	29	3.1	19.3	353
3 55 PCT T	33	.107	12.68	710	12.791	12928	9	211	182	.197	.5	31	26.8	39.5	180
4 25 PCT T	96	.167	11.95	192	12.123	7938	3	221	33	.077	.3	17	2.6	18.2	356
5 10 PCT T	35	.155	12.07	52	12.229	6577	2	168	7	.057	.1	10	.9	7.9	909
6 25 PCT T	37	.165	12.07	186	12.239	8029	3	219	32	.077	.2	17	2.5	17.8	353
7 90 PCT T	19	.691	19.73	655	15.373	20099	3	1691	226	.113	.3	191	25.5	63.5	53
8 25 PCT T	15	.092	12.19	183	12.289	7938	1	120	31	.077	.1	9	2.9	17.8	353
9 C.T.	9032	.021	.13	1	.555	0	0	0	0	.193	0.0	0	0.0	0.0	597
1 IDLE	896	.091	8.89	27	9.078	1951	16	29	1	.232	3.6	7	.3	0.0	997
2 25 PCT T	209	.319	11.60	168	11.937	8119	16	931	30	.077	1.2	33	2.3	17.8	356
3 55 PCT T	97	.099	12.80	650	12.905	12519	5	195	166	.197	.8	29	24.5	39.0	183
4 25 PCT T	58	.148	11.95	201	12.129	7983	4	223	35	.077	.3	17	2.7	18.1	356
5 10 PCT T	95	.196	12.07	51	12.221	6622	3	159	8	.057	.2	9	.9	7.9	909
6 25 PCT T	99	.169	11.95	186	12.129	8029	3	226	32	.077	.2	17	2.5	17.7	356
7 90 PCT T	27	.690	19.73	680	15.373	20099	4	1686	239	.113	.5	190	26.9	63.8	53
8 25 PCT T	22	.090	12.07	195	12.163	7666	2	115	32	.077	.1	9	2.5	17.8	358
9 C.T.	3890	.020	.13	1	.539	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	17.5	0.0	0	3.3	R	R	.092	R	600	23.7	50.6	2.7	.9	9.8	0.0
2 25	13.9	25.9	68	17.8	.688	1.5	.059	.919	1999	18.6	19.1	7.9	9.8	8.5	7.8
3 55	7.1	53.0	190	27.9	.517	3.9	.058	.315	1992	17.3	10.5	10.1	92.2	25.1	30.5
4 25	14.0	29.3	69	17.5	.719	1.9	.055	.937	1997	18.2	5.2	5.5	9.0	8.9	7.3
5 10	16.1	10.0	26	19.5	1.959	.7	.055	.889	2003	18.0	2.9	3.1	.7	5.1	2.2
6 25	13.9	23.9	63	17.7	.790	1.3	.055	.950	1999	18.0	9.2	5.5	3.9	8.5	7.2
7 90	2.1	85.1	225	99.3	.521	2.6	.069	.317	1987	19.5	6.9	62.1	90.2	31.2	37.7
8 25	13.9	23.9	63	17.5	.732	1.3	.056	.995	2000	18.0	1.7	3.0	3.8	8.9	7.2
9 CT	23.5	0.0	0	0.0	I	I	.003	I	2000	375.6	0.0	0.0	0.0	0.0	0.0
1 I	17.6	0.0	0	3.2	R	R	.092	R	597	29.0	52.9	2.2	.9	9.6	0.0
2 25	14.0	23.8	63	17.9	.751	1.3	.059	.957	1995	18.9	17.6	10.6	3.8	8.6	7.3
3 55	7.2	52.3	138	27.6	.527	3.2	.058	.321	1990	17.2	10.9	9.2	39.7	25.3	30.9
4 25	14.0	29.3	69	17.6	.725	1.9	.055	.991	1998	18.2	4.8	5.5	9.9	8.5	7.9
5 10	16.1	9.9	26	19.6	1.972	.8	.055	.895	1999	18.1	2.3	2.9	.7	5.2	2.2
6 25	14.0	23.8	63	17.7	.794	1.9	.055	.953	1995	18.2	3.6	5.6	9.1	8.5	7.2
7 90	2.1	85.6	226	99.2	.517	2.7	.069	.319	1986	19.5	6.6	61.1	92.9	31.2	38.2
8 25	14.1	23.9	63	16.9	.707	1.9	.055	.930	2000	18.1	1.7	2.8	9.1	8.1	7.3
9 CT	23.6	0.0	0	0.0	I	I	.003	I	2001	390.9	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .4 16 3.3

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 16 3.2

TWO CYCLE COMPOSITE -

HC- FID	0.35(.3) + 0.65(.9) =	.327	G/KW HR	(.244 BS)
CO- NDIR	0.35(16.1) + 0.65(16.9) =	16.307	G/KW HR	(12.160 BS)
NOX-CL	0.35(3.3) + 0.65(3.2) =	3.271	G/KW HR	(2.439 BS)
	HC + NOX =	3.598	G/KW HR	(2.683 BS)
	SFC =	.389	KG/KW HR	(.632 BS)

TABLE G-5. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

12 27 76 1117 AM TEST 3-1 375 DUR HRS OPTIMIZED 350 CID CHEVROLET HD GAS ENGINE K= .780 HUM= 3.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON G/HR	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	728	.120	9.00	29	9.199	1588	19	92	1	.232	3.2	10	.3	0.0	932
2 25 PCT T	229	.199	11.19	216	11.363	7989	16	269	37	.077	1.3	20	2.8	17.2	353
3 55 PCT T	99	.116	12.68	720	12.802	12701	5	233	185	.197	.8	39	27.2	39.3	175
4 25 PCT T	100	.158	11.37	270	11.539	7257	7	201	99	.077	.5	15	3.9	17.2	356
5 10 PCT T	82	.200	11.60	62	11.809	6123	5	209	8	.057	.3	12	.5	6.8	904
6 25 PCT T	91	.170	11.98	330	11.660	6713	6	198	99	.077	.9	15	3.8	18.8	398
7 90 PCT T	19	.971	14.73	710	15.203	19731	3	1239	239	.113	.3	139	27.0	62.9	53
8 25 PCT T	34	.113	11.58	300	11.697	7399	2	145	99	.077	.2	11	3.8	17.5	351
9 C.T.	9980	.026	.19	6	.615	0	0	0	0	.193	0.0	0	0.0	0.0	592
1 IDLE	1109	.099	9.00	32	9.219	1588	21	33	1	.232	9.8	8	.3	0.0	939
2 25 PCT T	309	.231	11.25	207	11.515	7897	23	318	37	.077	1.8	25	2.8	17.3	351
3 55 PCT T	56	.118	12.80	670	12.925	12701	6	235	170	.197	.9	35	25.1	39.9	175
4 25 PCT T	100	.156	11.37	290	11.537	7989	7	209	99	.077	.6	16	3.8	17.7	351
5 10 PCT T	99	.198	11.98	66	11.688	6123	5	209	9	.057	.3	12	.5	7.5	901
6 25 PCT T	96	.161	11.37	310	11.592	6713	6	189	97	.077	.5	15	3.6	18.1	351
7 90 PCT T	25	.520	14.73	690	15.254	19691	9	1352	213	.113	.9	153	29.1	62.3	56
8 25 PCT T	38	.109	11.98	270	11.593	7399	3	190	95	.077	.2	11	3.9	17.3	353
9 C.T.	9896	.025	.13	6	.565	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CID	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	17.0	0.0	0	3.5	R	R	.092	R	550	23.7	95.9	3.8	.9	5.2	0.0
2 25	13.9	23.1	61	16.5	.719	1.6	.052	.939	1995	19.3	18.0	7.9	9.1	8.2	7.1
3 55	6.9	52.7	190	28.0	.531	3.5	.058	.323	1975	17.3	11.5	13.3	39.6	26.5	31.0
4 25	14.0	23.1	61	16.0	.692	1.9	.052	.921	1995	19.1	7.7	6.0	9.9	7.9	7.1
5 10	15.9	9.1	29	13.5	1.991	.9	.059	.907	1995	18.6	3.9	9.6	.7	5.0	2.1
6 25	13.7	25.2	66	19.8	.588	2.0	.053	.358	1995	18.9	6.9	5.9	5.5	7.3	7.7
7 90	2.1	83.7	223	93.5	.520	2.9	.068	.316	1975	19.7	9.6	59.2	39.2	31.7	37.8
8 25	13.8	23.5	62	16.3	.695	2.1	.053	.923	1975	18.8	2.6	9.3	5.5	8.1	7.2
9 CT	23.3	0.0	0	0.0	I	I	.003	I	1990	339.0	0.0	0.0	0.0	0.0	0.0
1 I	17.1	0.0	0	3.5	R	R	.092	R	550	23.6	50.8	2.8	.5	5.2	0.0
2 25	13.8	23.2	61	17.3	.795	1.4	.052	.953	1995	19.1	18.7	9.0	9.9	8.5	7.1
3 55	6.9	52.9	191	28.0	.529	3.3	.058	.322	1975	17.1	9.6	12.7	39.9	26.9	31.0
4 25	13.8	23.7	62	16.5	.696	2.1	.052	.929	1995	19.1	5.9	5.8	5.9	8.2	7.3
5 10	15.8	10.1	27	13.5	1.339	.9	.053	.815	1995	18.8	3.3	9.9	.8	9.9	2.3
6 25	13.8	29.2	69	19.8	.611	2.0	.052	.372	1995	19.1	5.1	5.9	5.7	7.3	7.9
7 90	2.2	83.5	222	93.3	.519	2.6	.068	.315	1975	19.6	9.9	56.1	37.9	31.9	37.7
8 25	13.9	23.2	61	16.3	.702	1.9	.053	.927	1995	19.0	2.2	9.0	5.9	8.1	7.1
9 CT	23.9	0.0	0	0.0	I	I	.003	I	1990	369.0	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .9 19 3.7

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .5 15 3.9

TWO CYCLE COMPOSITE -

HC- FID	0.35(.9) + 0.65(.5) =	.963	G/KW	HR	(.395 88)
CO- NDIR	0.35(13.9) + 0.65(19.0) =	19.960	G/KW	HR	(10.783 88)
NOX-CL	0.35(3.9) + 0.65(3.9) =	3.538	G/KW	HR	(2.639 88)
	HC + NOX =	4.002	G/KW	HR	(2.984 88)
	SFC =	.378	KG/KW	HR	(.621 88)

TABLE G-6. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 450-CID HD ENGINE---PROJECT 11-9311

01 03 77 3:19 PM TEST 9-3 500 DUR HRS OPTIMIZED 350 CID CHEV HD GAS PRE-MAINT K= .835 HUM= 5.0 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	560	.129	9.10	28	9.290	1633	11	96	1	.232	2.5	11	.3	0.0	939
2 25 PCT T	50	.211	12.55	119	12.766	8301	9	277	21	.077	.3	21	1.7	17.6	328
3 55 PCT T	22	.076	12.80	665	12.879	12979	2	199	179	.197	.9	22	26.2	39.0	165
4 25 PCT T	19	.100	12.68	135	12.782	8165	1	129	29	.077	.1	10	1.8	17.6	333
5 10 PCT T	33	.108	12.31	55	12.422	6486	2	119	8	.057	.1	6	.5	6.0	401
6 25 PCT T	18	.090	12.80	135	12.892	8759	1	123	25	.077	.1	9	2.0	17.7	328
7 90 PCT T	13	.365	14.87	855	15.237	19278	2	933	300	.113	.2	105	33.9	62.3	53
8 25 PCT T	19	.060	12.93	179	12.992	2948	1	78	32	.077	.1	6	2.9	17.3	338
9 C.T.	9512	.029	.13	7	.610	0	0	0	0	.193	0.0	0	0.0	0.0	599
1 IDLE	1184	.082	9.10	31	9.310	1633	23	29	2	.232	5.2	7	.3	0.0	932
2 25 PCT T	196	.319	12.31	137	12.695	8618	11	938	26	.077	.9	39	2.0	18.1	328
3 55 PCT T	52	.075	12.80	670	12.881	12927	6	153	186	.197	.9	22	27.9	38.3	168
4 25 PCT T	92	.112	12.55	158	12.667	8165	3	196	28	.077	.2	11	2.2	18.1	330
5 10 PCT T	93	.101	12.31	60	12.415	6577	3	108	9	.057	.1	6	.5	6.8	396
6 25 PCT T	39	.112	12.55	167	12.666	8982	3	152	31	.077	.2	12	2.9	17.7	333
7 90 PCT T	23	.361	14.87	860	15.239	19231	3	995	309	.113	.9	107	34.9	62.2	53
8 25 PCT T	29	.068	12.19	203	12.261	2938	2	89	38	.077	.1	7	2.9	17.7	340
9 C.T.	9916	.013	.11	8	.565	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- KW	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 I	17.1	0.0	0	3.6	R	R	.093	R	550	23.9	66.7	5.6	.5	5.2	0.0
2 25	12.9	23.7	62	18.3	.774	.9	.058	.971	2000	17.3	7.5	11.1	2.9	8.7	7.3
3 55	6.5	52.2	137	27.5	.526	3.9	.058	.320	2000	17.2	9.9	11.9	38.2	25.1	30.9
4 25	13.1	23.6	62	18.0	.762	1.0	.058	.963	2000	17.3	2.8	5.2	2.7	8.6	7.3
5 10	15.8	8.0	21	19.3	1.228	1.0	.056	1.081	2000	17.8	2.9	3.9	.7	5.1	1.8
6 25	12.9	23.7	62	19.3	.815	1.1	.058	.996	2005	17.2	2.8	5.0	2.8	9.2	7.3
7 90	2.1	83.6	220	42.5	.509	3.6	.068	.309	1995	19.6	5.7	55.2	59.3	29.8	38.0
8 25	13.3	23.3	61	17.5	.753	1.9	.057	.958	2000	17.7	2.1	3.1	3.5	8.9	7.2
9 CT	23.9	0.0	0	0.0	I	I	.083	I	2000	391.5	0.0	0.0	0.0	0.0	0.0
1 I	17.0	0.0	0	3.6	R	R	.093	R	595	23.9	65.1	3.3	.5	5.1	0.0
2 25	12.9	29.2	69	19.0	.784	1.1	.057	.977	2000	17.5	10.7	16.9	2.7	8.9	7.5
3 55	6.6	51.9	135	28.5	.555	3.7	.058	.337	2000	17.2	10.7	10.9	37.7	25.5	30.3
4 25	13.0	29.2	63	18.0	.793	1.2	.057	.952	2005	17.5	2.9	5.5	3.0	8.9	7.5
5 10	15.6	9.1	24	19.5	1.541	1.0	.056	.968	2010	17.8	1.8	3.0	.7	5.0	2.1
6 25	13.1	23.8	62	18.7	.796	1.3	.057	.978	2010	17.5	2.9	5.7	3.3	8.8	7.4
7 90	2.1	83.5	219	43.5	.521	3.7	.068	.317	2000	19.6	9.8	51.9	58.1	30.0	37.9
8 25	13.9	23.7	62	17.5	.739	1.6	.056	.949	2005	18.0	1.7	3.3	9.0	8.2	7.3
9 CT	23.9	0.0	0	0.0	I	I	.083	I	1995	369.2	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .2 10 3.7

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 11 3.9

TWO CYCLE COMPOSITE -

HC- FID	0.35(.2) + 0.65(.9) =	.354	G/KW HR	(.264	BS)
CO- NDIR	0.35(10.9) + 0.65(11.2) =	10.890	G/KW HR	(8.121	BS)
NOX-CL	0.35(3.7) + 0.65(3.9) =	3.868	G/KW HR	(2.885	BS)
	HC + NOX =	9.222	G/KW HR	(3.199	BS)
	SFC =	.399	KG/KW HR	(.656	BS)

TABLE G-7. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

01 09 77 1922 TEST 5-1 500 DUR HRS OPTIMIZED 350 CID CHEV HD GAS POST MAINT K= .817 HUM= 9.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	856	.167	9.00	23	9.259	1819	18	66	1	.232	9.2	15	.3	0.0	909
2 25 PCT T	256	.180	11.37	161	11.578	8391	21	269	32	.077	1.6	20	2.9	17.3	335
3 55 PCT T	91	.079	12.68	530	12.769	12927	5	162	196	.197	.7	29	21.9	39.8	195
9 25 PCT T	62	.159	12.07	171	12.236	8301	5	218	31	.077	.9	17	2.9	17.3	390
5 10 PCT T	71	.162	12.19	99	12.360	6809	9	180	7	.057	.2	10	.9	6.9	901
6 25 PCT T	78	.159	11.83	225	11.993	7989	5	195	38	.077	.9	15	2.9	17.8	390
7 90 PCT T	13	.119	14.73	1020	14.850	18779	2	302	350	.113	.2	34	39.5	62.9	53
8 25 PCT T	38	.109	11.72	228	11.829	7938	3	192	92	.077	.2	11	3.2	17.8	390
9 C.T.	9916	.022	.12	6	.586	0	0	0	0	.193	0.0	0	0.0	0.0	589
1 IDLE	1328	.099	9.20	29	9.938	1819	28	37	2	.232	6.9	8	.9	0.0	927
2 25 PCT T	272	.331	11.83	197	12.191	7997	19	930	26	.077	1.5	33	2.0	17.8	335
3 55 PCT T	58	.089	12.68	580	12.776	12610	6	178	155	.197	.9	26	22.8	38.0	163
9 25 PCT T	80	.157	12.07	186	12.235	8119	6	210	33	.077	.5	16	2.6	17.8	338
5 10 PCT T	80	.152	12.19	59	12.351	6895	5	171	8	.057	.3	10	.5	7.2	399
6 25 PCT T	63	.157	12.19	186	12.359	7983	5	209	33	.077	.3	16	2.5	18.1	333
7 90 PCT T	19	.139	14.73	990	14.866	18869	3	399	391	.113	.3	39	38.5	62.2	53
8 25 PCT T	37	.100	12.07	209	12.179	7938	3	131	36	.077	.2	10	2.8	17.9	393
9 C.T.	5298	.022	.11	7	.658	0	0	0	0	.193	0.0	0	0.0	0.0	592

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- Kw	CHP	CTQ	FC	RSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	16.1	0.0	0	9.0	R	R	.093	R	625	23.5	53.2	10.9	.9	5.8	0.0
2 25	13.2	23.2	61	18.5	.796	1.9	.053	.989	2000	19.0	19.9	13.8	3.9	8.8	7.1
3 55	5.7	53.9	191	28.5	.539	2.8	.058	.325	1995	17.3	8.6	16.3	29.5	26.0	31.3
9 25	13.9	23.3	61	18.3	.787	1.9	.055	.979	2000	18.0	9.5	11.5	3.3	8.8	7.1
5 10	15.8	9.6	23	15.0	1.791	.9	.056	1.059	2005	17.9	3.1	7.0	.6	5.3	2.0
6 25	13.9	23.8	62	16.5	.692	1.6	.059	.921	2005	18.9	5.2	10.2	9.0	7.9	7.3
7 90	2.1	89.3	222	91.9	.991	9.2	.067	.299	1995	15.0	2.7	23.3	59.9	29.1	37.9
8 25	13.9	23.8	63	17.5	.735	1.8	.059	.997	2000	18.6	2.7	7.9	9.9	8.9	7.3
9 CT	23.0	0.0	0	0.0	I	I	.003	I	1995	356.8	0.0	0.0	0.0	0.0	0.0
1 I	14.8	0.0	0	9.0	R	R	.093	R	550	23.1	61.9	5.9	.5	5.8	0.0
2 25	13.2	23.8	63	17.3	.727	1.1	.055	.992	2000	18.1	19.3	20.9	2.7	8.3	7.9
3 55	6.9	51.0	139	27.8	.595	3.1	.050	.332	1995	17.3	9.0	16.5	31.7	25.5	30.2
9 25	13.3	23.8	63	17.9	.752	1.9	.055	.957	2000	18.0	9.3	10.2	3.6	8.6	7.9
5 10	15.7	9.6	25	15.2	1.574	.9	.056	.958	2005	17.9	2.7	6.2	.6	5.9	2.2
6 25	13.1	29.9	69	17.6	.723	1.9	.056	.990	2000	17.9	3.3	9.9	3.5	8.5	7.6
7 90	2.1	83.9	219	91.6	.999	9.1	.067	.309	1995	15.0	3.0	29.5	53.5	29.9	38.0
8 25	13.5	23.3	61	17.5	.751	1.6	.055	.957	2000	18.1	2.0	6.9	3.9	8.9	7.2
9 CT	23.3	0.0	0	0.0	I	I	.003	I	1995	316.7	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)----------	.9	8	3.9		
SUM---(COMPOSITE VALUE FOR CYCLE 2)----------	.6	9	3.9		
TWO CYCLE COMPOSITE - HC- FID 0.35(.9) + 0.65(.6) =	.523	G/KW	HR	(.390 BS)	
CO- NDIR 0.35(7.9) + 0.65(8.7) =	8.409	G/KW	HR	(6.267 BS)	
NOX-CL 0.35(3.9) + 0.65(3.9) =	3.937	G/KW	HR	(2.936 BS)	
HC + NOX =	4.460	G/KW	HR	(3.326 BS)	
SFC =	.392	KG/KW	HR	(.644 BS)	

TABLE G-8. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-4311

01 10 77 4:26 PM TEST6-3 625 DUR HRS OPTIMIZED 350 CID CHEVROLET HD GAS ENGINE K= .723 HUM= 2.0 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	990	.127	9.10	29	9.275	1729	9	98	1	.232	2.1	11	.3	0.0	939
2 25 PCT T	58	.215	12.07	180	12.292	9117	5	323	32	.077	.9	25	2.5	17.7	333
3 55 PCT T	19	.080	12.55	630	12.633	12927	2	166	155	.197	.3	29	22.7	37.0	168
4 25 PCT T	32	.193	11.83	239	11.976	7997	2	189	37	.077	.2	15	2.8	16.9	345
5 10 PCT T	21	.109	12.43	54	12.536	6527	1	110	7	.057	.1	6	.9	6.3	909
6 25 PCT T	28	.193	11.95	225	12.096	7620	2	181	39	.077	.2	19	2.6	17.3	393
7 90 PCT T	18	.619	19.46	770	15.076	19958	3	1642	295	.113	.3	186	27.6	60.3	51
8 25 PCT T	15	.090	11.95	239	12.092	7756	1	117	36	.077	.1	9	2.8	16.9	345
9 C.T.	9928	.095	.16	7	.698	0	0	0	0	.193	0.0	0	0.0	0.0	592
1 IDLE	1029	.102	8.89	31	9.102	1729	21	39	1	.232	4.9	9	.3	0.0	939
2 25 PCT T	189	.288	11.83	177	12.138	8396	19	900	29	.077	1.1	31	2.2	17.0	398
3 55 PCT T	56	.083	12.68	625	12.769	12837	6	168	151	.197	.9	25	22.2	37.1	170
4 25 PCT T	58	.191	11.83	233	11.977	7938	4	188	37	.077	.3	15	2.9	17.0	393
5 10 PCT T	39	.096	12.43	60	12.530	6713	2	109	8	.057	.1	6	.9	7.0	399
6 25 PCT T	96	.190	11.83	255	11.975	7989	3	176	38	.077	.2	19	2.9	17.9	390
7 90 PCT T	28	.956	19.96	890	19.919	20185	4	1295	289	.113	.5	191	32.6	61.0	51
8 25 PCT T	27	.086	11.83	237	11.919	7756	2	113	37	.077	.2	9	2.8	16.9	398
9 C.T.	9800	.099	.14	8	.685	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- KW	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 I	17.1	0.0	0	3.8	R	R	.093	R	600	23.5	58.2	3.8	.5	5.9	0.0
2 25	13.1	23.7	63	20.1	.898	1.3	.056	.516	1990	17.9	10.9	8.6	9.0	9.5	7.6
3 55	6.6	99.6	132	28.5	.575	3.1	.057	.399	1980	17.5	9.0	8.9	36.8	25.6	30.9
4 25	13.6	22.6	60	17.3	.765	1.6	.059	.965	1985	18.9	5.1	5.0	9.6	8.1	7.3
5 10	15.9	8.9	22	19.5	1.229	.8	.057	1.098	1995	17.6	2.0	2.2	.7	5.1	2.8
6 25	13.5	23.3	61	16.8	.722	1.5	.055	.939	1995	18.2	4.3	4.8	4.2	7.9	7.5
7 90	2.0	80.8	215	99.0	.599	3.0	.068	.331	1975	19.8	8.7	69.0	99.7	30.9	38.0
8 25	13.6	22.7	60	17.1	.752	1.6	.055	.958	1990	18.3	2.3	3.1	9.5	8.0	7.3
9 CT	23.3	0.0	0	0.0	I	I	.003	I	1980	298.9	0.0	0.0	0.0	0.0	0.0
1 I	17.1	0.0	0	3.8	R	R	.092	R	600	23.9	59.2	3.6	.5	5.9	0.0
2 25	13.7	22.8	60	18.9	.806	1.3	.055	.990	1995	18.1	13.2	12.9	3.9	8.7	7.3
3 55	6.7	99.7	132	28.3	.569	3.0	.058	.396	1980	17.3	11.2	10.0	33.3	25.6	30.3
4 25	13.5	22.8	60	17.5	.767	1.6	.059	.967	1995	18.9	9.0	5.8	9.3	8.3	7.3
5 10	15.7	9.9	25	19.8	1.571	.8	.057	.956	1995	17.6	1.6	2.9	.7	5.2	2.2
6 25	13.9	23.3	61	16.5	.709	1.6	.059	.931	1995	18.9	3.0	5.5	4.9	7.8	7.9
7 90	2.0	81.8	218	99.5	.599	3.5	.067	.331	1975	19.9	5.9	56.7	99.1	30.9	38.9
8 25	13.7	22.0	59	17.1	.774	1.7	.059	.972	1975	18.5	1.8	3.5	9.3	8.1	7.0
9 CT	23.9	0.0	0	0.0	I	I	.003	I	1975	309.3	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .2 16 3.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .5 19 3.7

TWO CYCLE COMPOSITE - HC- FID 0.35(.2) + 0.65(.5) = .369 G/KW HR (.272 GM)

CO- NDIR 0.35(16.0) + 0.65(13.7) = 14.530 G/KW HR (10.835 GM)

NOX-CL 0.35(3.9) + 0.65(3.7) = 3.787 G/KW HR (2.679 GM)

HC + NOX = 3.951 G/KW HR (2.996 GM)

BFC = .912 KG/KW HR (.677 GM)

TABLE G-9. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

01 17 77 1552 TEST 7-2 750 DUR HRS OPTIMIZED 350 CID CHEVROLET HD GAS ENGINE K= .755 HUM= 2.8 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CRW	VAC. MM
1 IDLE	656	.130	9.30	35	9.502	2091	15	57	2	.232	3.6	13	.9	0.0	934
2 25 PCT T	60	.277	12.80	96	13.089	8981	5	384	17	.077	.9	30	1.3	18.2	317
3 55 PCT T	29	.099	12.92	570	13.017	12156	3	177	139	.197	.9	26	19.6	38.9	170
4 25 PCT T	96	.183	12.07	179	12.258	7938	3	290	28	.077	.3	18	2.2	16.9	356
5 10 PCT T	79	.208	11.83	61	12.097	6759	5	236	9	.057	.3	13	.5	7.9	909
6 25 PCT T	93	.196	12.19	209	12.391	7938	3	259	33	.077	.2	20	2.5	17.5	353
7 90 PCT T	57	1.006	19.96	600	15.973	19550	8	2568	190	.113	.9	290	21.5	61.1	53
8 25 PCT T	27	.109	12.19	165	12.302	7938	2	192	27	.077	.1	11	2.1	16.3	356
9 C.T.	5189	.090	.18	9	.739	0	0	0	0	.193	0.0	0	0.0	0.0	597
1 IDLE	1029	.100	9.10	39	9.311	1270	15	28	1	.232	3.5	6	.3	0.0	939
2 25 PCT T	200	.938	12.07	132	12.530	7847	14	554	21	.077	1.1	43	1.6	17.1	340
3 55 PCT T	60	.109	13.05	530	13.161	12020	6	192	121	.197	.9	28	17.8	37.9	173
4 25 PCT T	62	.180	12.07	179	12.257	8255	5	295	29	.077	.4	19	2.3	16.7	351
5 10 PCT T	88	.206	11.83	58	12.095	6899	6	236	8	.057	.3	13	.5	7.9	901
6 25 PCT T	55	.193	12.19	179	12.389	8079	4	259	28	.077	.3	20	2.2	17.1	348
7 90 PCT T	68	1.015	19.96	570	15.983	19187	10	2592	177	.113	1.1	287	20.0	60.8	53
8 25 PCT T	34	.107	12.19	120	12.301	8210	3	195	30	.077	.2	11	2.3	17.1	348
9 C.T.	9864	.090	.19	3	.668	0	0	0	0	.193	0.0	0	0.0	0.0	597

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	17.1	0.0	0	9.5	R	R	.099	R	600	22.9	57.9	3.1	.9	6.9	0.0
2 25	12.5	29.5	69	19.8	.810	.7	.059	.993	2005	16.9	5.7	7.0	2.5	9.9	7.7
3 55	6.7	51.9	135	26.8	.521	2.6	.059	.317	2005	17.0	7.2	6.2	39.2	29.2	30.9
4 25	14.0	21.9	58	17.5	.798	1.3	.056	.985	2000	18.0	9.1	9.9	9.3	8.3	6.9
5 10	15.9	10.0	24	14.9	1.492	.9	.055	.907	2005	18.3	9.2	3.2	1.0	5.2	2.3
6 25	13.9	23.9	61	17.5	.797	1.9	.056	.955	2000	17.8	3.8	9.6	5.0	8.3	7.9
7 90	2.1	81.9	214	93.1	.526	2.3	.070	.320	1995	19.9	15.0	68.9	92.9	28.9	37.9
8 25	14.0	21.9	58	17.5	.749	1.2	.056	.986	2000	17.9	2.9	2.6	9.1	8.3	6.9
9 CT	23.5	0.0	0	0.0	I	I	.009	I	1995	281.9	0.0	0.0	0.0	0.0	0.0
1 I	17.1	0.0	0	2.8	R	R	.043	R	600	23.9	95.3	1.5	.6	9.1	0.0
2 25	13.9	23.0	60	17.3	.753	.9	.057	.958	2005	17.6	13.9	10.0	3.9	9.5	7.3
3 55	6.8	50.8	133	26.5	.522	2.9	.059	.317	2000	16.8	11.6	6.6	38.0	29.8	30.7
4 25	13.8	22.9	59	18.2	.812	1.3	.056	.999	2000	18.0	9.6	9.9	9.8	8.9	7.1
5 10	15.8	10.0	26	15.1	1.513	.8	.055	.920	2005	18.3	9.1	3.1	1.0	5.5	2.3
6 25	13.7	23.0	60	17.8	.775	1.2	.056	.972	2005	17.8	9.0	9.6	9.7	8.7	7.3
7 90	2.1	81.6	219	92.3	.519	2.2	.070	.315	2000	19.3	19.0	67.2	92.6	30.5	38.0
8 25	13.7	22.9	60	18.1	.790	1.3	.056	.981	2000	17.9	2.5	2.6	9.9	8.9	7.3
9 CT	23.5	0.0	0	0.0	1	1	.003	I	1995	312.1	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 23 2.7

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 29 2.6

TWO CYCLE COMPOSITE -

HC- FID 0.35(.3) + 0.65(.9) = .396 G/KW HR (.295 BS)

CO- NDIR 0.35(23.0) + 0.65(23.5) = 23.332 G/KW HR (17.399 BS)

NOX-CL 0.35(2.7) + 0.65(2.6) = 2.636 G/KW HR (1.966 BS)

HC + NUX = 3.032 G/KW HR (2.261 BS)

SFC = .397 KG/KW HR (.653 BS)

TABLE G-10. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

01 29 77 1253 PM TEST 9-2 #75 DUR HWS OPTIMIZED 350 CID CHEV HD ENGINE W/O CAT K= .832 HUM= 9.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	880	.128	9.08	39	9.389	1769	18	99	2	.232	4.2	11	.9	0.0	939
2 25 PCT T	75	.218	12.88	35	13.106	8618	6	289	6	.077	.9	22	.5	16.9	323
3 55 PCT T	23	.079	12.92	550	12.997	12292	2	192	199	.147	.9	21	21.1	37.0	173
4 25 PCT T	19	.070	12.92	127	12.992	8982	1	93	23	.077	.1	7	1.8	17.2	328
5 10 PCT T	96	.100	11.95	61	12.055	6532	3	110	9	.057	.2	6	.5	7.1	396
6 25 PCT T	19	.087	12.68	142	12.769	8301	1	119	25	.077	.1	9	2.0	17.2	335
7 90 PCT T	35	.782	19.60	689	15.385	19323	5	1983	239	.113	.6	229	27.0	61.1	51
8 25 PCT T	13	.029	13.05	125	13.081	8528	1	38	23	.077	.1	3	1.7	17.6	328
9 C.T.	3956	.035	.35	3	.732	0	0	0	0	.193	0.0	0	0.0	0.0	607
1 IDLE	1280	.080	9.00	39	9.218	1633	25	29	2	.232	5.7	7	.9	0.0	932
2 25 PCT T	168	.370	12.90	108	12.789	8573	13	501	20	.077	1.0	39	1.5	17.6	328
3 55 PCT T	37	.077	12.92	530	13.001	12292	4	147	138	.147	.6	22	20.3	37.3	173
4 25 PCT T	31	.091	12.68	147	12.779	8210	2	118	26	.077	.2	9	2.0	17.2	335
5 10 PCT T	61	.112	11.83	57	11.999	6350	4	120	8	.057	.2	7	.5	6.8	401
6 25 PCT T	23	.097	12.80	138	12.900	8396	2	127	25	.077	.1	10	1.9	17.6	333
7 90 PCT T	36	.764	19.60	685	15.368	19278	5	1936	237	.113	.6	219	26.8	61.1	51
8 25 PCT T	15	.096	12.62	156	12.667	8119	1	59	28	.077	.1	5	2.1	16.8	340
9 C.T.	3328	.037	.90	3	.771	0	0	0	0	.193	0.0	0	0.0	0.0	607

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- Hv	CHP	CTQ	FC	BSFC	BSNOx	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 I	17.1	0.0	0	3.9	R	R	.093	R	620	23.9	70.1	3.8	.8	5.6	0.0
2 25	12.7	22.6	59	19.0	.841	.3	.059	.511	2010	16.9	7.1	7.3	.9	9.0	7.2
3 55	6.8	49.6	130	27.1	.546	2.9	.059	.332	2005	17.0	6.0	6.9	38.9	29.5	30.1
4 25	12.9	23.1	60	18.7	.809	1.0	.059	.492	2010	17.0	1.8	2.3	3.2	8.8	7.3
5 10	15.4	9.6	25	14.9	1.505	1.0	.055	.916	2015	18.3	2.6	2.1	.9	5.0	2.3
6 25	13.2	23.1	60	18.3	.791	1.1	.058	.481	2010	17.3	1.8	2.9	3.6	8.7	7.9
7 90	2.0	82.0	215	92.6	.520	2.9	.069	.316	2000	14.5	9.9	73.8	99.1	29.6	30.3
8 25	12.9	23.6	62	18.8	.798	1.0	.059	.485	2005	16.9	1.2	1.0	3.2	8.9	7.5
9 CT	23.9	0.0	0	0.0	I	I	.009	I	2000	285.9	0.0	0.0	0.0	0.0	0.0
1 I	17.0	0.0	0	3.6	R	R	.092	R	605	23.6	67.7	2.1	.7	5.2	0.0
2 25	12.9	23.6	62	18.9	.800	.8	.058	.487	2010	17.3	11.5	12.2	2.8	9.1	7.5
3 55	6.8	50.1	131	27.1	.541	2.8	.059	.329	2005	17.0	6.8	6.8	36.6	29.8	30.3
4 25	13.2	23.1	60	18.1	.783	1.1	.058	.477	2010	17.3	2.0	2.9	3.6	8.7	7.3
5 10	15.8	9.1	24	14.0	1.541	.9	.059	.937	2020	18.9	2.9	2.2	.9	5.0	2.1
6 25	13.1	23.6	62	18.9	.779	1.0	.058	.479	2010	17.2	1.5	3.1	3.9	8.8	7.5
7 90	2.0	82.0	215	92.5	.519	2.9	.069	.315	2000	14.5	6.9	69.3	98.2	29.9	30.1
8 25	13.9	22.5	59	17.9	.799	1.2	.057	.483	2005	17.5	1.0	1.9	3.8	8.6	7.1
9 CT	23.9	0.0	0	0.0	I	I	.009	I	2000	271.1	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 17 3.0

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .5 17 3.1

TWO CYCLE COMPOSITE -

HC- FID 0.35(.3) + 0.65(.5) = .918 G/KW HR (.312 BS)

CO- NDIR 0.35(16.8) + 0.65(17.4) = 17.211 G/KW HR (12.839 BS)

NOX-CL 0.35(3.0) + 0.65(3.1) = 3.059 G/KW HR (2.281 BS)

HC + NOX = 3.977 G/KW HR (2.593 BS)

SFC = .905 KG/KW HR (.665 BS)

TABLE G-11. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

1-31-77 1131 AM TEST 11-1 1000 DU2 HR CHEV 350 CID HD GAS W/O CAT PRE-MAINT K= .786 HUM= 3.6 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	599	.132	9.51	35	9.701	1729	11	97	2	.232	2.9	11	.9	0.0	939
2 25 PCT T	120	.251	12.19	197	12.959	8791	9	392	26	.077	.7	26	2.0	17.5	395
3 55 PCT T	52	.069	12.92	570	12.990	12929	6	125	193	.197	.8	18	21.0	38.1	178
4 25 PCT T	50	.099	12.19	171	12.290	7711	3	119	28	.077	.3	9	2.2	16.9	356
5 10 PCT T	52	.082	12.19	61	12.278	6986	3	88	8	.057	.2	5	.5	7.9	906
6 25 PCT T	99	.091	12.31	179	12.406	8029	3	119	30	.077	.2	9	2.3	17.1	351
7 90 PCT T	96	1.599	14.07	925	15.675	20185	19	9196	160	.113	1.6	960	18.0	61.0	53
8 25 PCT T	33	.019	12.31	168	12.333	7466	2	29	27	.077	.2	2	2.1	16.7	356
9 C.T.	3956	.023	.98	9	.778	0	0	0	0	.193	0.0	0	0.0	0.0	599
1 IDLE	568	.069	9.20	37	9.326	1598	10	22	2	.232	2.9	5	.9	0.0	939
2 25 PCT T	192	.270	11.72	159	12.006	8119	11	369	28	.077	.8	28	2.2	17.1	351
3 55 PCT T	92	.061	12.48	525	12.796	12701	5	123	199	.197	.7	18	22.0	38.1	175
4 25 PCT T	92	.088	11.95	177	12.093	7802	3	115	30	.077	.2	9	2.3	16.7	358
5 10 PCT T	92	.079	11.95	59	12.039	6532	3	87	8	.057	.1	5	.5	7.1	909
6 25 PCT T	33	.091	12.19	180	12.285	8029	2	121	31	.077	.2	9	2.9	17.1	353
7 90 PCT T	73	1.316	13.94	595	15.269	20185	11	3515	188	.113	1.2	397	21.2	61.7	53
8 25 PCT T	29	.099	12.19	173	12.236	7711	2	56	28	.077	.1	9	2.2	16.3	358
9 C.T.	3680	.026	.98	5	.876	0	0	0	0	.193	0.0	0	0.0	0.0	597

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	17.3	0.0	0	3.8	R	R	.099	R	615	22.5	38.0	2.0	.8	5.5	0.0
2 25	13.6	23.9	62	18.5	.789	1.1	.056	.980	2000	17.7	10.8	9.8	9.1	8.8	7.9
3 55	7.0	51.1	135	27.5	.538	2.8	.059	.327	1990	17.1	12.8	3.3	93.3	25.0	30.9
4 25	14.0	22.0	58	17.0	.774	1.3	.056	.971	2000	18.0	9.2	1.7	9.9	8.1	6.9
5 10	16.0	10.0	26	19.3	1.931	.8	.056	.871	2000	18.0	2.7	.9	1.0	5.0	2.3
6 25	13.8	23.0	60	17.7	.770	1.3	.056	.969	2000	17.8	3.8	1.7	9.8	8.9	7.3
7 90	2.1	81.9	214	99.5	.599	1.9	.071	.331	1990	14.1	29.9	85.3	37.2	31.1	30.0
8 25	14.0	22.9	59	16.9	.753	1.2	.056	.958	2000	17.9	2.7	.3	9.3	8.0	7.1
9 CT	23.6	0.0	0	0.0	I	I	.009	I	1995	271.3	0.0	0.0	0.0	0.0	0.0
1 I	17.3	0.0	0	3.5	R	R	.093	R	610	23.9	91.9	1.1	.7	5.0	0.0
2 25	13.8	22.9	60	17.9	.780	1.2	.055	.975	2000	18.3	19.0	6.0	9.1	8.5	7.3
3 55	6.9	51.1	135	28.0	.598	2.9	.058	.333	1995	17.9	11.7	3.8	91.9	25.5	30.9
4 25	14.1	22.9	59	17.2	.760	1.3	.055	.967	2000	18.3	9.0	1.9	9.3	8.2	7.1
5 10	16.1	9.5	25	19.9	1.523	.9	.055	.926	2000	18.3	2.5	1.0	.9	5.1	2.2
6 25	13.9	22.9	60	17.8	.778	1.3	.056	.973	2000	18.0	3.2	2.0	9.5	8.5	7.2
7 90	2.1	82.8	218	99.5	.538	2.3	.069	.327	1990	14.5	21.2	83.9	90.0	31.1	30.9
8 25	14.1	21.9	58	17.0	.774	1.3	.055	.972	2000	18.0	2.2	.9	9.1	8.1	6.9
9 CT	23.5	0.0	0	0.0	I	I	.009	I	1995	238.6	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .9 30 2.7

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .3 26 2.9

TWO CYCLE COMPOSITE -

HC- FID	0.35(.9) + 0.65(.3) =	.333	G/KW	HR	(.299	88)
CO- NDIR	0.35(30.2) + 0.65(26.1) =	27.553	G/KW	HR	(20.596	88)
NOX-CL	0.35(2.7) + 0.65(2.9) =	2.826	G/KW	HR	(2.107	88)
	HC + NOX =	3.159	G/KW	HR	(2.356	88)
	SFC =	.909	KG/KW	HR	(.669	88)

TABLE G-12. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

02-02-77 1028 AM TEST 13-2 1000 DUR HRS CHEV 350 CID HD GAS W/O CAT POST MAINT K= .890 HUM= 6.6 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	133	.123	9.10	39	9.237	1769	3	97	2	.232	.6	11	.9	0.0	937
2 25 PCT T	20	.273	11.72	198	11.995	7983	1	367	29	.077	.1	28	2.2	17.1	390
3 55 PCT T	20	.086	12.92	520	13.008	12202	2	162	199	.197	.3	29	21.2	37.9	185
4 25 PCT T	35	.136	11.95	182	12.089	7802	3	177	35	.077	.2	14	2.7	17.9	353
5 10 PCT T	188	.191	10.97	72	10.432	5761	11	155	12	.057	.6	9	.7	6.3	927
6 25 PCT T	50	.162	11.95	175	12.117	7938	3	215	34	.077	.2	17	2.6	17.8	390
7 90 PCT T	18	.957	19.73	702	15.189	19006	3	1155	260	.113	.3	130	29.3	61.5	61
8 25 PCT T	19	.085	11.65	225	11.737	7489	1	109	92	.077	.1	8	3.3	17.9	363
9 C.T.	3795	.029	.39	9	.758	0	0	0	0	.193	0.0	0	0.0	0.0	599
1 IDLE	229	.086	9.10	35	9.220	1588	19	30	2	.232	3.9	7	.9	0.0	939
2 25 PCT T	188	.919	11.83	129	12.265	8119	19	553	29	.077	1.1	93	1.9	17.5	390
3 55 PCT T	32	.077	12.92	997	13.008	12292	3	196	139	.197	.5	22	20.9	37.9	183
4 25 PCT T	96	.120	11.72	182	11.896	7666	3	158	35	.077	.3	12	2.7	16.7	361
5 10 PCT T	169	.190	10.80	66	10.958	5851	10	151	10	.057	.5	9	.6	6.3	929
6 25 PCT T	59	.197	12.07	108	12.229	7938	4	193	21	.077	.3	15	1.6	17.5	351
7 90 PCT T	19	.377	19.60	730	19.980	19006	3	967	279	.113	.3	109	30.9	61.3	61
8 25 PCT T	216	.077	11.72	28	11.821	7466	16	101	4	.077	1.2	8	.3	17.1	361
9 C.T.	3584	.028	.43	9	.717	0	0	0	0	.193	0.0	0	0.0	0.0	602

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	ASNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 I	17.2	0.0	0	3.9	0	0	.092	0	610	23.6	25.5	9.6	.7	5.8	0.0
2 25	13.9	22.9	60	17.6	.767	1.3	.059	.967	2005	18.9	9.5	11.7	3.6	8.7	7.2
3 55	7.3	50.2	132	26.9	.536	2.9	.059	.326	2000	17.0	12.3	9.9	39.0	25.3	30.3
4 25	13.9	23.9	61	17.2	.736	1.5	.055	.998	2000	18.2	7.7	5.6	9.3	8.5	7.9
5 10	16.8	8.5	22	12.7	1.500	1.9	.049	.912	2005	20.6	25.9	3.7	1.1	9.6	2.0
6 25	13.7	23.9	63	17.5	.733	1.9	.055	.996	2000	18.2	8.9	6.9	9.2	8.6	7.5
7 90	2.9	82.9	217	91.9	.508	3.1	.068	.309	1995	19.7	11.5	59.2	97.0	30.3	38.2
8 25	19.3	23.9	61	16.5	.705	1.8	.053	.929	2000	18.8	9.1	3.5	5.2	8.1	7.9
9 CT	23.6	0.0	0	0.0	I	I	.009	I	2000	278.9	0.0	0.0	0.0	0.0	0.0
1 I	17.3	0.0	0	3.5	0	0	.093	0	610	23.5	99.6	3.1	.7	5.2	0.0
2 25	13.7	23.5	62	17.9	.762	1.0	.056	.964	2005	17.9	19.2	19.0	3.2	8.8	7.9
3 55	7.2	50.8	133	27.1	.533	2.7	.059	.329	2000	17.0	6.6	9.6	39.7	25.5	30.7
4 25	19.2	22.9	59	16.9	.759	1.5	.059	.958	2000	18.6	3.9	5.9	9.6	8.3	7.1
5 10	16.7	8.5	22	12.9	1.519	1.2	.050	.929	2005	20.0	7.3	3.8	1.0	9.7	2.0
6 25	13.8	23.5	62	17.5	.795	.9	.055	.953	2005	18.0	9.0	6.7	2.7	8.6	7.9
7 90	2.9	82.1	216	91.9	.518	3.3	.067	.310	2000	19.9	9.1	98.9	52.6	30.9	38.1
8 25	19.2	22.9	60	16.[illegible]	.737	.2	.059	.998	2000	18.6	15.9	3.5	.5	8.3	7.2
9 CT	23.7	0.0	0	0.0	I	I	.003	I	2000	291.1	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .1 13 3.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 12 3.2

TWO CYCLE COMPOSITE -

HC- FID 0.35(.1) + 0.65(.9) = .317 G/KW HR (.236 BS)

CO- NDIR 0.35(13.2) + 0.65(12.3) = 12.595 G/KW HR (9.392 BS)

NOx-CL 0.35(3.9) + 0.65(3.2) = 3.293 G/KW HR (2.456 BS)

HC + NOX = 3.610 G/KW HR (2.692 BS)

SFC = .390 KG/KW HR (.641 BS)

TABLE G-13. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

02 08 77 1036 AM TEST 15-1 1175 DUR HRS OPTIMIZED 350 CID CHEV HD ENGINE W/O CAT K= .871 HUM= 6.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	626	.129	8.89	71	9.082	1769	13	99	2	.232	3.1	11	.9	0.0	992
2 25 PCT T	112	.279	11.83	193	12.121	8982	9	399	29	.077	.7	30	2.2	17.7	393
3 55 PCT T	15	.091	13.05	506	13.193	12979	2	179	139	.197	.2	26	20.9	37.1	183
4 25 PCT T	39	.115	11.60	228	11.719	7525	3	150	93	.077	.2	12	3.3	17.3	363
5 10 PCT T	103	.129	11.19	68	11.276	5897	6	131	10	.057	.3	7	.6	7.0	919
6 25 PCT T	96	.133	11.60	298	11.738	7711	3	177	97	.077	.3	19	3.6	17.7	363
7 90 PCT T	96	.857	19.96	691	15.322	19051	7	2151	231	.113	.7	293	26.1	60.5	61
8 25 PCT T	23	.076	11.37	269	11.999	7303	2	98	58	.077	.1	8	3.8	16.9	373
9 C.T.	3795	.026	.36	9	.767	0	0	0	0	.193	0.0	0	0.0	0.0	602
1 IDLE	752	.073	8.89	33	9.095	1997	13	29	2	.232	3.1	6	.9	0.0	997
2 25 PCT T	200	.299	11.60	159	11.922	8079	15	909	31	.077	1.2	32	2.9	16.9	351
3 55 PCT T	32	.087	13.05	920	13.191	12020	3	161	129	.197	.5	24	18.3	37.1	183
4 25 PCT T	58	.103	11.98	293	11.589	7939	4	133	95	.077	.3	10	3.5	17.3	363
5 10 PCT T	132	.115	10.91	71	11.090	5897	8	129	11	.057	.9	7	.6	7.9	919
6 25 PCT T	42	.112	11.98	258	11.599	7689	4	146	98	.077	.3	11	3.7	17.3	366
7 90 PCT T	56	.928	19.96	620	15.395	18960	8	2309	221	.113	.9	261	25.0	60.6	61
8 25 PCT T	32	.067	11.37	270	11.991	7212	2	86	99	.077	.2	7	3.8	16.9	373
9 C.T.	3589	.017	.98	9	.777	0	0	0	0	.193	0.0	0	0.0	0.0	602

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- Mv	CMP	CTQ	FC	BSFC	BSNOx	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 I	17.9	0.0	0	3.9	R	R	.092	R	605	23.9	59.3	3.2	.7	5.8	0.0
2 2S	13.5	23.7	62	18.7	.789	1.6	.055	.980	2000	18.2	11.9	8.7	3.7	9.2	7.5
3 5S	7.2	99.7	131	27.5	.553	2.8	.059	.337	1995	16.9	9.2	7.3	33.8	25.7	30.2
4 2S	19.3	23.2	61	16.7	.721	1.8	.053	.939	2000	18.8	3.8	3.3	5.9	8.2	7.9
5 10	16.5	9.9	25	13.0	1.387	1.1	.051	.899	2000	19.5	6.0	2.1	1.0	9.7	2.2
6 2S	19.3	23.7	62	17.0	.718	2.0	.053	.937	2000	18.8	9.6	3.9	6.0	8.3	7.5
7 90	2.9	81.2	219	92.0	.517	2.8	.069	.315	1995	19.5	13.1	69.3	93.1	30.2	37.9
8 2S	19.7	22.7	60	16.1	.709	2.2	.052	.932	2000	19.2	2.2	2.2	6.3	7.9	7.2
9 CT	23.7	0.0	0	0.0	I	I	.009	I	1995	272.3	0.0	0.0	0.0	0.0	0.0
1 I	17.6	0.0	0	3.3	R	R	.092	R	620	29.0	95.1	1.6	.6	5.0	0.0
2 2S	13.8	21.9	58	17.8	.811	1.3	.059	.999	2000	18.5	16.7	8.8	4.2	9.0	7.0
3 5S	7.2	99.7	131	26.5	.533	2.5	.059	.329	1995	16.9	7.0	6.6	31.7	25.5	30.9
4 2S	19.3	23.2	61	16.9	.707	1.9	.053	.930	2000	19.0	9.6	2.9	6.0	8.3	7.9
5 10	16.5	9.9	26	13.0	1.316	1.1	.050	.801	2000	19.9	6.9	2.0	1.1	9.9	2.3
6 2S	19.9	23.2	61	16.5	.711	2.0	.053	.932	2000	19.0	9.9	3.1	6.9	8.3	7.9
7 90	2.9	81.3	219	91.8	.519	2.7	.069	.313	1995	19.9	12.8	73.1	93.3	31.0	38.2
8 2S	19.7	22.7	60	15.9	.700	2.1	.052	.926	2000	19.2	2.5	1.8	6.6	8.0	7.3
9 CT	23.7	0.0	0	0.0	I	I	.009	I	1995	268.8	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 19 3.3

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 20 3.2

TWO CYCLE COMPOSITE -

HC- FID	0.35(.3) + 0.65(.9) =	.355	G/KW HR	(.264 88)
CO- NDIR	0.35(19.2) + 0.65(19.5) =	19.905	G/KW HR	(19.970 88)
NOX-CL	0.35(3.3) + 0.65(3.2) =	3.205	G/KW HR	(2.390 88)
	HC + NOX =	3.559	G/KW HR	(2.654 88)
	SFC =	.389	KG/KW HR	(.639 88)

TABLE G-14. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

02-19-77 1217 PM TEST 17-2 1250 DUR HRS OPTIMIZED 350 CID CHEV HD ENGINE W/O CAT K= .898 HUM= 6.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	736	.133	8.79	35	9.003	1729	15	52	2	.232	3.5	12	.5	0.0	939
2 25 PCT T	16	.087	12.80	105	12.889	9117	1	129	22	.077	.1	10	1.7	18.1	310
3 55 PCT T	10	.052	12.68	975	12.739	12156	1	101	135	.197	.2	15	19.9	37.5	168
4 25 PCT T	8	.035	12.92	107	12.956	8669	1	97	21	.077	.0	9	1.6	17.2	317
5 10 PCT T	188	.086	10.69	80	10.797	6078	12	98	13	.057	.7	6	.8	6.9	911
6 25 PCT T	6	.038	13.05	99	13.089	8890	0	52	20	.077	.0	9	1.5	17.6	312
7 90 PCT T	19	.933	13.99	880	19.379	18688	2	1137	391	.113	.2	128	38.5	61.6	58
8 25 PCT T	5	.026	12.92	113	12.997	8618	0	35	22	.077	.0	3	1.7	17.2	320
9 C.T.	9192	.097	.98	9	.868	0	0	0	0	.193	0.0	0	0.0	0.0	602
1 IDLE	1232	.082	8.79	36	9.005	1588	29	29	2	.232	5.5	7	.9	0.0	939
2 25 PCT T	55	.198	12.80	98	12.959	9026	9	209	20	.077	.3	16	1.6	18.0	310
3 55 PCT T	26	.052	12.68	960	12.735	12338	3	102	133	.197	.9	15	19.5	37.3	168
4 25 PCT T	18	.035	12.80	107	12.837	8618	1	97	21	.077	.1	9	1.6	17.2	320
5 10 PCT T	392	.099	10.97	83	10.607	6123	25	110	19	.057	1.9	6	.8	6.9	909
6 25 PCT T	13	.091	12.92	105	12.962	8895	1	56	21	.077	.1	9	1.6	17.2	317
7 90 PCT T	20	.925	13.99	865	19.368	19597	3	1112	339	.113	.3	126	37.7	60.8	58
8 25 PCT T	20	.023	12.80	107	12.826	8618	2	32	21	.077	.1	2	1.7	17.2	320
9 C.T.	3968	.097	.99	9	.885	0	0	0	0	.193	0.0	0	0.0	0.0	602

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- Mv	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL------- HC	CO	NOX	FUEL	POWER
1 I	17.3	0.0	0	3.8	R	R	.091	R	600	29.1	73.7	6.6	.7	5.9	0.0
2 25	12.2	29.3	63	20.1	.827	.9	.058	.503	2020	17.2	2.0	5.3	2.6	9.5	7.6
3 55	6.6	50.2	132	26.8	.539	2.7	.058	.325	2005	17.9	3.3	8.2	30.0	29.3	30.2
4 25	12.5	23.1	61	19.1	.827	.9	.058	.503	2005	17.1	1.0	2.0	2.5	9.1	7.3
5 10	16.2	8.6	22	13.9	1.569	1.6	.099	.951	2010	20.3	13.8	3.1	1.2	9.7	2.0
6 25	12.3	23.6	62	19.6	.831	.9	.059	.505	2000	16.9	.7	2.2	2.3	9.3	7.9
7 90	2.3	82.6	218	91.2	.999	9.1	.065	.303	1995	15.5	9.9	71.0	58.2	28.7	38.2
8 25	12.6	23.1	61	19.0	.822	1.0	.058	.500	2000	17.1	.6	1.5	2.6	9.0	7.3
9 CT	23.7	0.0	0	0.0	I	I	.009	I	1995	240.6	0.0	0.0	0.0	0.0	0.0
1 I	17.3	0.0	0	3.5	R	R	.091	R	600	29.1	66.2	3.8	.6	5.0	0.0
2 25	12.2	29.1	63	19.9	.829	.8	.059	.501	2000	17.1	9.0	8.9	2.9	9.5	7.7
3 55	6.6	50.1	132	27.2	.593	2.7	.058	.330	1995	17.9	5.0	8.3	30.1	29.7	30.9
4 25	12.6	23.1	61	19.0	.829	.9	.058	.501	1995	17.2	1.3	2.0	2.5	9.0	7.3
5 10	16.1	8.6	22	13.5	1.577	1.7	.098	.959	2005	20.7	17.2	3.5	1.3	9.8	2.0
6 25	12.5	23.1	61	19.5	.896	.9	.059	.519	1995	17.1	.9	2.9	2.5	9.3	7.3
7 90	2.3	81.6	216	91.0	.503	9.1	.065	.306	1980	15.5	9.0	69.8	58.0	28.6	38.0
8 25	12.6	23.1	61	19.0	.829	.9	.058	.501	1995	17.3	1.9	1.9	2.5	9.0	7.3
9 CT	23.7	0.0	0	0.0	I	I	.009	I	1980	235.9	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 10 3.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .5 10 3.6

TWO CYCLE COMPOSITE -

HC- FID 0.35(.3) + 0.65(.5) = .390 G/KW HR (.291 BB)

CO- NDIR 0.35(9.9) + 0.65(10.0) = 9.985 G/KW HR (7.996 BB)

NOX-CL 0.35(3.6) + 0.65(3.6) = 3.622 G/KW HR (2.701 BB)

HC + NOX = 9.012 G/KW HR (2.991 BB)

SFC = .905 KG/KW HR (.666 BB)

TABLE G-15. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

02-21-77 1039 TEST 19- 1 1375DUR HRS 1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311
OPTIMIZED 350 CID CHEV HD ENGINE W/O CAT K= .916 HUM= 7.5 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKN	VAC. MM
1 IDLE	1829	.155	8.69	35	9.092	1819	90	63	2	.232	9.2	15	.5	0.0	929
2 25 PCT T	71	.137	11.66	191	11.805	8165	5	192	30	.077	.9	15	2.3	17.5	335
3 55 PCT T	23	.050	12.68	390	12.733	12796	3	102	119	.197	.9	15	17.9	37.5	160
4 25 PCT T	32	.085	11.25	207	11.339	7756	2	117	93	.077	.2	4	3.3	17.5	351
5 10 PCT T	152	.090	11.30	63	11.407	6350	9	102	11	.057	.5	6	.6	6.7	904
6 25 PCT T	39	.093	11.25	201	11.397	7847	3	130	92	.077	.2	10	3.3	17.1	351
7 90 PCT T	25	.525	13.94	790	14.968	18960	4	1389	315	.113	.9	157	35.6	61.2	58
8 25 PCT T	23	.065	11.03	290	11.092	7489	2	88	99	.077	.1	7	3.8	16.7	371
9 C.T.	3956	.030	.39	5	.767	0	0	0	0	.193	0.0	0	0.0	0.0	587
1 IDLE	3202	.081	8.02	33	8.996	1819	74	35	2	.232	17.2	8	.5	0.0	927
2 25 PCT T	398	.102	11.60	120	11.821	8391	27	261	26	.077	2.1	20	2.0	17.1	333
3 55 PCT T	36	.099	12.68	390	12.733	12882	4	100	120	.197	.6	15	17.6	37.9	160
4 25 PCT T	39	.078	11.25	192	11.333	7802	3	109	90	.077	.2	8	3.1	17.1	351
5 10 PCT T	218	.092	10.91	60	11.026	6260	14	106	10	.057	.8	6	.6	6.3	909
6 25 PCT T	39	.092	11.37	192	11.966	7847	3	127	90	.077	.2	10	3.1	17.5	345
7 90 PCT T	26	.525	13.94	760	14.968	18824	4	1380	301	.113	.9	156	34.0	61.0	61
8 25 PCT T	23	.062	11.03	222	11.094	7489	2	89	96	.077	.1	6	3.5	16.8	361
9 C.T.	3776	.029	.39	4	.799	0	0	0	0	.193	0.0	0	0.0	0.0	587

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- NV	CHP	CTQ	FC	BSFC	BSNOX	F/A	BFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	16.9	0.0	0	9.0	0	R	.042	R	695	29.0	80.2	6.2	.7	5.8	0.0
2 25	13.2	23.5	62	18.0	.767	1.3	.059	.966	2005	18.7	3.7	6.3	3.9	8.7	7.9
3 55	6.3	50.3	132	28.1	.558	2.9	.058	.390	2000	17.9	3.3	6.9	26.1	26.8	38.5
4 25	13.8	23.9	62	17.1	.730	1.8	.052	.999	2000	19.9	1.6	3.9	5.0	8.3	7.9
5 10	16.0	9.8	24	19.0	1.557	1.2	.052	.997	2005	19.3	9.7	2.5	.9	5.0	2.1
6 25	13.8	22.9	60	17.3	.755	1.8	.052	.959	2000	19.9	1.7	4.3	4.9	8.9	7.3
7 90	2.3	82.8	216	91.8	.518	3.8	.066	.310	1995	15.3	3.7	67.9	53.3	29.7	38.2
8 25	14.6	22.9	59	16.5	.736	2.2	.051	.998	2000	19.8	1.1	2.9	5.7	8.8	7.1
9 CT	23.1	0.0	0	0.0	I	I	.009	I	2000	272.5	0.0	0.0	0.0	0.0	0.0
1 I	16.8	0.0	0	9.0	0	R	.039	R	690	25.6	79.3	3.6	.8	5.8	0.0
2 25	13.1	23.8	60	18.5	.805	1.1	.059	.990	2005	18.6	4.8	8.8	3.1	8.9	7.3
3 55	6.3	50.8	133	28.9	.559	2.9	.058	.390	2000	17.9	2.8	6.9	27.9	26.2	38.8
4 25	13.8	22.9	60	17.2	.751	1.7	.052	.957	2000	19.9	1.1	3.6	4.8	8.3	7.3
5 10	16.1	8.5	22	13.8	1.625	1.2	.050	.988	2005	19.9	3.6	2.6	.9	9.9	2.0
6 25	13.6	23.9	62	17.3	.738	1.7	.052	.999	2000	19.2	.9	9.3	4.8	8.9	7.9
7 90	2.9	81.8	215	91.5	.508	3.7	.065	.389	1995	15.3	2.0	67.9	52.8	29.9	38.1
8 25	14.9	22.5	59	16.5	.734	2.0	.050	.997	2000	19.8	.6	2.8	5.9	8.8	7.1
9 CT	23.1	0.8	0	0.0	I	I	.009	I	2000	263.2	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .6 13 3.7
SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- 1.2 13 3.6

THD CYCLE COMPOSITE -

HC- FID	0.35(.6) + 0.65(1.2) =	.996	G/KW HR	(.743 GM)
CO- NDIR	0.35(12.8) + 0.65(12.7) =	12.720	G/KW HR	(9.485 GM)
NOX-CL	0.35(3.7) + 0.65(3.6) =	3.599	G/KW HR	(2.683 GM)
	HC + NOX =	4.590	G/KW HR	(3.423 GM)
	BFC =	.399	KG/KW HR	(.656 GM)

TABLE G-16. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HO ENGINE---PROJECT 11-9311

02 28 77 1105 AM TEST 21-1 1500 DUR HRS OPTIMIZED 350 CID CHEV W/O CAT KH .766 HUMH 3.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKH	VAC. MM
1 IDLE	484	.129	8.60	35	8.795	1819	15	52	2	.232	3.9	12	.9	0.0	939
2 25 PCT T	119	.218	11.37	189	11.600	8079	9	306	33	.077	.7	24	2.6	18.1	343
3 55 PCT T	19	.070	12.93	510	12.502	12297	2	138	127	.197	.3	28	18.7	37.1	173
4 25 PCT T	95	.109	11.19	252	11.299	7989	3	190	93	.077	.3	11	3.3	16.5	361
5 10 PCT T	39	.131	11.98	60	11.615	6350	2	199	8	.057	.1	8	.5	6.4	911
6 25 PCT T	95	.112	11.19	250	11.257	7930	3	151	99	.077	.3	12	3.9	16.9	358
7 90 PCT T	23	.598	13.99	890	19.591	10733	3	1556	275	.113	.9	176	31.1	60.6	61
8 25 PCT T	22	.070	11.19	247	11.221	7999	2	109	95	.077	.1	8	3.9	16.5	356
9 C.T.	3890	.026	.29	5	.701	0	0	0	0	.193	0.0	0	0.0	0.0	597
1 IDLE	829	.082	8.50	37	8.671	1588	16	30	2	.232	3.8	7	.9	0.0	992
2 25 PCT T	192	.208	11.03	192	11.259	7711	15	287	33	.077	1.1	22	2.6	16.9	356
3 55 PCT T	38	.067	12.91	515	12.382	12297	9	139	130	.197	.6	28	19.0	37.5	173
4 25 PCT T	63	.097	11.03	293	11.139	7999	5	130	91	.077	.9	10	3.2	16.6	363
5 10 PCT T	56	.133	11.37	62	11.509	6350	3	199	9	.057	.2	8	.5	7.0	919
6 25 PCT T	52	.109	11.19	258	11.255	7989	9	196	99	.077	.3	11	3.9	17.3	358
7 90 PCT T	31	.581	13.94	855	19.525	10829	5	1521	282	.113	.5	172	31.8	60.6	61
8 25 PCT T	29	.067	11.03	276	11.100	7999	2	98	97	.077	.1	7	3.6	16.5	366
9 C.T.	3552	.026	.29	5	.672	0	0	0	0	.193	0.0	0	0.0	0.0	597

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	17.3	0.0	0	9.8	R	R	.098	R	610	29.7	61.9	9.9	.7	6.0	0.0
2 25	13.5	29.2	63	17.8	.735	1.9	.059	.997	2085	19.0	12.2	8.7	9.1	8.0	7.8
3 55	6.8	99.8	131	27.0	.592	2.5	.057	.330	2000	17.7	5.5	7.5	29.5	25.5	30.5
4 25	14.2	22.1	58	16.5	.796	1.9	.051	.959	1995	19.5	9.6	9.8	5.2	8.2	7.1
5 10	16.2	8.9	23	19.0	1.581	.9	.053	.962	1995	18.9	2.9	3.0	.8	5.1	2.1
6 25	14.1	22.7	60	16.6	.732	1.9	.051	.995	2000	19.5	9.6	9.3	5.3	8.2	7.3
7 90	2.9	81.3	219	91.3	.608	3.3	.046	.309	1995	15.3	6.9	66.0	99.1	30.0	30.2
8 25	14.0	22.2	58	16.3	.736	2.0	.051	.997	1995	19.6	2.2	9.0	5.9	8.1	7.1
9 CT	23.5	0.0	0	0.0	I	I	.003	I	1995	297.7	0.0	0.0	0.0	0.0	0.0
1 I	17.9	0.0	0	3.5	R	R	.090	R	610	25.0	53.9	2.7	.6	5.3	0.0
2 25	14.0	22.7	60	17.0	.750	1.5	.051	.956	1995	19.5	14.0	8.6	9.0	8.5	7.3
3 55	6.8	50.2	132	27.0	.537	2.5	.056	.327	1995	17.8	8.8	7.7	29.5	25.8	30.7
4 25	14.3	22.2	58	16.3	.739	1.8	.051	.997	2000	19.7	5.1	3.9	9.9	8.2	7.1
5 10	16.3	9.9	25	19.0	1.992	.9	.052	.988	2000	19.1	2.8	9.3	.8	5.2	2.2
6 25	14.1	23.1	61	16.5	.719	1.9	.051	.939	1995	19.5	9.2	9.9	5.2	8.3	7.9
7 90	2.9	81.3	219	91.5	.611	3.9	.065	.311	1995	15.3	7.9	66.7	99.9	30.5	30.2
8 25	14.9	22.2	58	16.3	.735	2.1	.051	.997	1995	19.8	1.9	2.7	5.6	8.2	7.1
9 CT	23.5	0.0	0	0.0	I	I	.003	I	1995	310.5	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 18 3.5

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .9 19 3.6

TWO CYCLE COMPOSITE -

HC- FID 0.35(.3) + 0.65(.9) = .357 G/KW HR (.266 BB)

CO- NDIR 0.35(19.9) + 0.65(19.2) = 19.430 G/KW HR (18.761 BB)

NOX-CL 0.35(3.5) + 0.65(3.6) = 3.529 G/KW HR (2.632 BB)

HC + NOX = 3.886 G/KW HR (2.898 BB)

BFC = .340 KG/KW HR (.692 BB)

TABLE G-17. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

01 19 77 3:30 TEST 8-1 000 CAT HRS OPTIMIZED 350 CID CHEV HD ENGINE W OXI CAT K= .774 HUM= 3.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	11	.009	9.72	92	9.730	1950	0	9	2	.232	.1	1	.5	0.0	909
2 25 PCT T	8	.009	12.31	207	12.320	8210	1	12	35	.077	.0	1	2.7	17.8	343
3 55 PCT T	9	.009	13.55	970	13.559	12882	0	17	115	.197	.1	2	16.9	37.7	163
4 25 PCT T	7	.009	12.19	269	12.199	7897	1	11	99	.077	.0	1	3.9	16.6	356
5 10 PCT T	19	.006	11.95	70	11.957	6396	1	6	10	.057	.0	0	.5	6.7	909
6 25 PCT T	13	.006	12.19	267	12.197	7938	1	8	95	.077	.1	1	3.9	17.9	351
7 90 PCT T	99	1.293	19.60	89	15.898	19913	7	3271	27	.113	.8	370	3.1	59.9	53
8 25 PCT T	12	.006	12.31	227	12.317	7893	1	8	37	.077	.1	1	2.9	16.6	356
9 C.T.	13	.006	.75	18	.757	0	0	0	0	.193	0.0	0	0.0	0.0	592
1 IDLE	20	.003	9.51	35	9.515	1860	0	1	2	.232	.1	0	.9	0.0	992
2 25 PCT T	20	.003	12.91	188	12.915	8079	1	9	30	.077	.1	0	2.3	17.0	358
3 55 PCT T	10	.003	13.93	952	13.939	12701	1	6	110	.197	.2	1	16.1	37.7	160
4 25 PCT T	10	.003	12.19	238	12.199	7983	1	7	90	.077	.1	0	3.1	17.9	351
5 10 PCT T	19	.003	11.95	67	11.959	6396	1	3	9	.057	.0	0	.5	7.0	909
6 25 PCT T	11	.003	12.31	237	12.319	8165	1	9	90	.077	.1	0	3.1	17.7	345
7 90 PCT T	99	1.259	19.60	71	15.859	19958	6	3187	23	.113	.7	360	2.6	60.9	53
8 25 PCT T	8	.003	12.31	232	12.319	7938	1	9	38	.077	.0	0	3.0	17.3	353
9 C.T.	15	.003	.76	9	.769	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 I	15.9	0.0	0	9.3	R	R	.095	R	650	22.5	9.7	.2	1.5	6.1	0.0
2 25	13.5	23.8	42	18.1	.760	1.5	.056	.962	2005	17.9	3.9	.2	8.2	8.5	7.6
3 55	6.9	50.5	133	28.9	.562	2.2	.061	.392	2000	16.9	5.3	.7	50.5	25.5	30.8
4 25	14.0	22.3	59	17.3	.777	1.9	.055	.972	2000	18.1	3.3	.2	10.1	8.1	7.1
5 10	16.1	8.9	23	14.1	1.578	1.1	.059	.960	2000	18.5	9.0	.1	1.6	9.9	2.1
6 25	13.8	23.3	61	17.5	.751	1.9	.055	.957	2000	18.1	6.1	.2	10.3	9.2	7.5
7 90	2.1	80.9	212	93.9	.596	.3	.072	.332	1990	19.0	67.2	98.3	9.2	30.3	37.7
8 25	14.0	22.3	59	17.9	.780	1.7	.056	.975	2000	17.9	5.6	.2	8.6	8.2	7.1
9 CT	23.3	0.0	0	0.0	I	I	.009	I	1995	277.9	0.0	0.0	0.0	0.0	0.0
1 I	17.9	0.0	0	9.1	R	R	.099	R	695	22.9	7.6	.1	1.3	5.8	0.0
2 25	14.1	22.8	60	17.8	.782	1.3	.058	.975	2000	17.2	8.9	.1	7.5	8.9	7.2
3 55	6.6	50.5	133	28.0	.554	2.2	.060	.387	2000	16.5	12.1	.2	51.8	25.2	30.6
4 25	13.8	23.3	61	17.6	.756	1.7	.055	.960	2000	18.1	9.3	.1	9.9	8.3	7.9
5 10	16.1	9.9	25	14.1	1.499	1.0	.059	.909	2005	18.5	3.7	.0	1.7	9.9	2.2
6 25	13.6	23.8	62	18.0	.757	1.7	.056	.960	2000	17.9	9.8	.1	10.0	8.5	7.5
7 90	2.1	81.0	213	99.0	.593	.3	.071	.330	1995	19.0	55.6	99.3	8.3	30.5	37.7
8 25	13.9	23.2	61	17.5	.759	1.6	.056	.959	1995	17.9	3.9	.1	9.5	8.3	7.9
9 CT	23.9	0.0	0	0.0	I	I	.009	I	1995	279.8	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .1 21 1.8

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .1 20 1.7

TWO CYCLE COMPOSITE -

HC- FID 0.35(.1) + 0.65(.1) = .069 G/KW HR (.051 GS)

CO- NDIR 0.35(20.8) + 0.65(19.8) = 20.155 G/KW HR (15.029 GS)

NOX-CL 0.35(1.8) + 0.65(1.7) = 1.751 G/KW HR (1.306 GS)

HC + NOX = 1.820 G/KW HR (1.357 GS)

SFC = .910 KG/KW HR (.679 GS)

TABLE G-1R. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

01-29-77 2139 PM TEST 10-1 12S CAT HRS OPTIMIZED 350 CID CHEV HD ENGINE W OXI CAT Kw .700 HUM= 3.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	96	.000	9.72	38	9.725	1819	1	0	2	.232	.2	0	.9	0.0	929
2 25 PCT T	25	.006	12.92	117	12.929	8573	2	8	20	.077	.1	1	1.6	16.8	325
3 55 PCT T	13	.006	13.30	920	13.307	12292	1	11	101	.197	.2	2	19.9	36.0	170
4 25 PCT T	15	.006	12.68	165	12.687	8079	1	7	27	.077	.1	1	2.1	17.2	340
5 10 PCT T	20	.006	12.19	63	12.198	4986	1	6	9	.057	.1	0	.5	6.7	396
6 25 PCT T	13	.006	12.92	197	12.927	8391	1	8	25	.077	.1	1	1.9	17.5	330
7 90 PCT T	30	1.233	14.60	209	15.836	19232	9	3029	66	.113	.5	342	7.5	59.1	53
8 25 PCT T	11	.006	13.05	151	13.057	8165	1	7	25	.077	.1	1	1.9	16.8	338
9 C.T.	29	.003	.80	6	.806	0	0	0	0	.193	0.0	0	0.0	0.0	599
1 IDLE	36	.003	9.61	38	9.617	1678	1	1	2	.232	.2	0	.9	0.0	922
2 25 PCT T	33	.003	12.80	129	12.807	8391	2	9	21	.077	.2	0	1.6	16.9	333
3 55 PCT T	12	.003	13.93	395	13.939	12292	1	5	95	.197	.2	1	13.9	36.2	173
4 25 PCT T	12	.001	12.80	199	12.803	8301	1	2	29	.077	.1	0	1.9	17.2	335
5 10 PCT T	18	.001	12.07	60	12.073	4350	1	1	8	.057	.1	0	.5	6.9	901
6 25 PCT T	12	.001	12.68	195	12.683	8396	1	2	25	.077	.1	0	1.9	17.2	333
7 90 PCT T	29	1.202	13.60	200	15.806	19278	9	2962	69	.113	.5	335	7.2	59.3	53
8 25 PCT T	11	.001	12.48	159	12.482	8079	1	2	26	.077	.1	0	2.0	16.8	340
9 C.T.	29	.000	.78	6	.783	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- Hv	CMP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL--------- HC	CO	NOX	FUEL	POWER
1 I	16.7	0.0	0	9.0	R	R	.095	R	605	22.5	16.5	.0	1.9	5.7	0.0
2 25	12.8	22.5	59	18.9	.891	.9	.058	.512	2005	17.1	10.9	.2	5.1	9.0	7.3
3 55	6.7	98.2	127	27.1	.562	2.1	.060	.392	1995	16.7	15.1	.5	98.9	29.7	30.1
4 25	13.9	23.0	60	17.8	.779	1.2	.057	.471	2005	17.9	4.3	.2	6.9	8.5	7.5
5 10	15.6	9.0	24	19.3	1.588	1.0	.055	.966	2005	18.1	5.1	.1	1.6	5.0	2.2
6 25	13.0	23.5	62	18.5	.788	1.1	.058	.479	2000	17.1	5.5	.2	6.2	8.8	7.7
7 90	2.1	79.2	209	92.9	.535	.8	.071	.326	1995	19.0	36.0	98.8	29.3	29.7	37.9
8 25	13.3	22.5	59	18.0	.801	1.1	.059	.487	2000	17.0	9.5	.2	6.2	8.6	7.3
9 CT	23.6	0.0	0	0.0	I	I	.009	I	2000	260.7	0.0	0.0	0.0	0.0	0.0
1 I	16.6	0.0	0	3.7	R	R	.099	R	610	22.7	12.8	.1	1.9	5.3	0.0
2 25	13.1	22.6	59	18.5	.818	.9	.058	.498	2010	17.3	15.0	.1	5.6	8.9	7.9
3 55	6.8	98.5	127	27.1	.559	1.9	.060	.390	2000	16.5	19.6	.2	97.3	29.8	30.2
4 25	13.2	23.1	60	18.3	.799	1.1	.058	.483	2005	17.3	5.9	.0	6.9	8.8	7.5
5 10	15.8	8.5	22	19.0	1.639	1.0	.055	.997	2010	18.3	4.8	.0	1.6	5.0	2.1
6 25	13.1	23.1	60	18.9	.797	1.1	.057	.485	2005	17.5	5.5	.0	6.5	8.8	7.5
7 90	2.1	79.6	209	92.5	.539	.8	.071	.325	2000	19.0	37.0	99.5	29.5	29.9	38.0
8 25	13.9	22.6	59	17.8	.788	1.1	.057	.479	2005	17.5	9.9	.0	6.7	8.5	7.9
9 CT	23.6	0.0	0	0.0	I	I	.009	I	2000	268.9	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .1 20 1.7

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .1 19 1.7

TWO CYCLE COMPOSITE -

HC- FID	0.35(.1) + 0.65(.1) =	.072	G/KW	HR	(.059	88)
CO- NDIR	0.35(19.6) + 0.65(19.1) =	19.282	G/KW	HR	(19.378	88)
NOX-CL	0.35(1.7) + 0.65(1.7) =	1.696	G/KW	HR	(1.265	88)
	HC + NOX =	1.768	G/KW	HR	(1.318	88)
	SFC =	.919	KG/KW	HR	(.681	88)

TABLE G-19. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

01 31 77 0120 PM TEST 12-1 250 CAT HRS CHEV 350 CID HD GAS WITH CAT PRE MAINT K= .892 HUM= 6.7 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CRN	VAC. MM
1 IDLE	33	.009	9.93	38	9.938	1729	1	1	2	.232	.1	0	.5	0.0	932
2 25 PCT T	13	.002	12.81	135	12.813	8895	1	3	28	.077	.1	0	2.1	17.1	323
3 55 PCT T	7	.009	13.39	960	13.399	12655	1	7	129	.193	.1	1	19.8	37.9	160
4 25 PCT T	7	.002	12.55	188	12.553	7802	0	2	35	.077	.0	0	2.7	17.5	351
5 10 PCT T	4	.002	12.55	55	12.553	6350	1	2	8	.057	.0	0	.5	6.7	911
6 25 PCT T	10	.002	12.68	186	12.683	8079	1	2	35	.077	.1	0	2.7	17.6	398
7 90 PCT T	69	1.703	19.20	325	15.910	20190	9	9353	122	.113	1.1	992	13.8	61.0	53
8 25 PCT T	19	.002	12.68	162	12.683	7711	1	2	29	.077	.1	0	2.2	17.2	356
9 C.T.	91	.000	.91	5	.919	318	1	0	1	.193	.2	0	.1	0.0	592
1 IDLE	37	.001	9.82	38	9.825	1592	1	0	2	.232	.1	0	.9	0.0	992
2 25 PCT T	29	.003	12.68	152	12.686	8079	2	9	29	.077	.2	0	2.2	17.6	395
3 55 PCT T	14	.002	13.93	990	13.939	12701	2	3	123	.193	.2	1	18.1	37.1	175
4 25 PCT T	17	.001	12.55	182	12.553	7897	1	2	34	.077	.1	0	2.6	17.1	353
5 10 PCT T	17	.001	12.93	59	12.932	6486	1	1	8	.057	.1	0	.5	6.3	911
6 25 PCT T	15	.001	12.68	188	12.683	8079	1	2	35	.077	.1	0	2.7	17.5	398
7 90 PCT T	68	1.703	19.20	325	15.910	19958	10	9319	121	.113	1.1	987	13.6	60.9	53
8 25 PCT T	12	.003	12.68	165	12.689	7711	1	9	30	.077	.1	0	2.3	17.2	356
9 C.T.	93	.000	.87	6	.879	318	2	0	1	.193	.2	0	.1	0.0	592

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	17.0	0.0	0	3.8	R	R	.095	R	600	22.0	8.1	.1	1.0	5.9	0.0
2 25	12.7	23.0	60	19.5	.898	1.2	.058	.516	2000	17.3	9.3	.0	9.9	9.2	7.3
3 55	6.6	50.1	133	27.9	.557	2.6	.060	.339	1985	16.6	6.2	.2	93.7	25.0	30.3
4 25	13.8	23.9	62	17.2	.739	1.5	.057	.996	1995	17.6	2.1	.0	6.1	8.1	7.9
5 10	16.2	9.0	24	19.0	1.559	.9	.057	.995	2000	17.6	1.6	.0	1.1	9.9	2.1
6 25	13.7	23.6	62	17.8	.756	1.5	.057	.960	2000	17.5	3.1	.0	6.2	8.9	7.5
7 90	2.1	81.8	216	99.9	.593	1.5	.072	.330	1990	13.9	58.9	99.6	31.7	30.6	38.1
8 25	19.0	23.1	61	17.0	.737	1.3	.057	.998	2000	17.5	9.1	.0	5.2	8.0	7.3
9 CT	23.3	0.0	0	.7	R	R	.009	R	1995	229.9	11.5	.0	.2	.6	0.0
1 I	17.9	0.0	0	3.9	R	R	.095	R	620	22.3	6.7	.0	1.0	9.9	0.0
2 25	13.6	23.6	62	17.8	.756	1.2	.057	.960	2000	17.9	7.3	.1	5.2	8.5	7.5
3 55	6.9	99.7	131	28.0	.563	2.5	.060	.393	1990	16.5	11.5	.1	92.6	25.9	30.2
4 25	13.9	22.9	60	17.3	.759	1.5	.057	.959	2000	17.6	9.2	.0	6.1	8.2	7.3
5 10	16.2	8.5	22	19.3	1.688	1.0	.056	1.027	2000	17.8	2.6	.0	1.1	5.0	2.0
6 25	13.7	23.9	62	17.8	.759	1.5	.057	.962	2000	17.5	3.8	.0	6.9	8.5	7.5
7 90	2.1	81.7	215	99.0	.539	1.5	.072	.328	1995	13.9	50.7	99.7	32.1	30.7	38.2
8 25	19.0	23.0	60	17.0	.739	1.3	.057	.999	2000	17.5	2.9	.1	5.9	8.1	7.3
9 CT	23.3	0.0	0	.7	R	R	.009	R	1995	240.3	10.3	.0	.2	.6	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .1 27 2.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .1 27 2.9

TWO CYCLE COMPOSITE -

HC- FID 0.35(.1) + 0.65(.1) = .113 G/KW HR (.089 88)

CO- NDIR 0.35(27.3) + 0.65(27.1) = 27.171 G/KW HR (20.261 88)

NOX-CL 0.35(2.9) + 0.65(2.9) = 2.379 G/KW HR (1.771 88)

HC + NOX = 2.987 G/KW HR (1.855 88)

SFC = .908 KG/KW HR (.671 88)

TABLE G-20. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

02-02-77 1235 PM TEST 14-1 250 CAT HRS CHEV 350 CID HD GAS WITH CAT POST MAINT K= .900 HUM= 7.0 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	37	.003	9.51	39	9.517	1678	1	1	2	.232	.2	0	.9	0.0	927
2 25 PCT T	20	.003	12.68	101	12.685	8437	1	4	20	.077	.1	0	1.5	17.6	325
3 55 PCT T	5	.003	13.17	330	13.179	17519	1	6	105	.197	.1	1	15.9	37.9	160
4 25 PCT T	10	.003	12.19	169	12.199	7893	1	4	32	.077	.1	0	2.9	17.6	393
5 10 PCT T	27	.000	11.19	75	11.193	5897	2	0	12	.057	.1	0	.7	7.1	911
6 25 PCT T	9	.000	12.68	132	12.681	8165	1	0	25	.077	.0	0	2.0	18.0	333
7 90 PCT T	12	.562	14.73	231	15.293	19051	2	1413	86	.113	.2	160	9.7	60.5	56
8 25 PCT T	6	.000	11.95	189	11.951	7575	0	0	36	.077	.0	0	2.8	16.9	351
9 C.T.	56	.000	.83	6	.836	0	0	0	0	.193	0.0	0	0.0	0.0	587
1 IDLE	37	.000	9.90	35	9.909	1588	1	0	2	.232	.2	0	.9	0.0	929
2 25 PCT T	31	.000	12.19	136	12.199	8165	2	0	27	.077	.2	0	2.1	17.6	338
3 55 PCT T	5	.000	13.17	346	13.179	12928	1	0	103	.197	.1	0	15.2	37.1	168
4 25 PCT T	9	.000	12.19	171	12.191	7867	1	0	33	.077	.0	0	2.5	17.6	393
5 10 PCT T	25	.000	11.03	70	11.033	5897	1	0	11	.057	.1	0	.6	6.7	919
6 25 PCT T	8	.000	12.65	139	12.651	8165	1	0	26	.077	.0	0	2.0	17.6	335
7 90 PCT T	9	.950	14.73	259	15.181	19051	1	1190	95	.113	.1	129	10.8	60.3	56
8 25 PCT T	5	.000	11.95	183	11.951	7711	0	0	35	.077	.0	0	2.7	16.9	351
9 C.T.	96	.000	.80	5	.805	0	0	0	0	.193	0.0	0	0.0	0.0	587

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	16.8	0.0	0	3.7	R	R	.099	R	600	22.9	21.2	.1	1.2	5.9	0.0
2 25	12.8	23.6	62	18.4	.789	R	.057	.980	2010	17.9	19.7	.2	9.9	9.8	7.5
3 55	6.3	58.1	131	27.6	.551	2.1	.059	.335	2010	16.8	10.1	.5	99.2	25.6	30.3
4 25	13.5	23.6	62	17.9	.737	1.3	.055	.998	2010	18.1	7.1	.2	7.0	8.5	7.5
5 10	14.2	9.6	25	13.0	1.359	1.2	.051	.827	2015	19.7	11.5	.0	1.9	9.7	2.2
6 25	13.1	29.2	63	18.0	.799	1.1	.057	.953	2015	17.5	6.9	.0	5.6	8.7	7.7
7 90	2.2	81.1	213	92.0	.518	1.1	.069	.315	2000	19.6	29.8	99.8	27.8	29.9	37.7
8 25	13.8	22.6	59	16.7	.738	1.6	.059	.999	2010	18.5	9.2	.0	7.9	8.1	7.2
9 CT	23.1	0.0	0	0.0	I	I	.089	I	2000	251.9	0.0	0.0	0.0	0.0	0.0
1 I	16.9	0.0	0	3.5	R	R	.093	R	615	23.2	20.6	.0	1.1	5.2	0.0
2 25	13.3	23.6	61	18.0	.763	1.1	.055	.969	2015	18.1	23.3	.0	5.8	8.8	7.5
3 55	6.6	59.7	131	27.9	.551	2.1	.059	.335	2000	16.8	10.2	.0	91.8	25.6	30.3
4 25	13.5	23.6	62	17.9	.739	1.4	.055	.997	2010	18.1	6.5	.0	7.0	8.5	7.5
5 10	16.3	9.0	24	13.0	1.437	1.2	.050	.879	2015	19.9	11.0	.0	1.8	9.7	2.1
6 25	13.2	23.6	62	18.0	.763	1.1	.057	.969	2010	17.6	5.8	.0	5.5	8.8	7.5
7 90	2.2	80.9	212	92.0	.519	1.2	.068	.316	2000	19.7	19.0	99.9	29.6	30.2	37.8
8 25	13.8	22.6	59	17.0	.751	1.4	.059	.957	2015	18.5	9.6	.0	7.5	8.3	7.2
9 CT	23.1	0.0	0	0.0	I	I	.089	I	2000	261.0	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .0 9 1.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .0 7 2.0

TWO CYCLE COMPOSITE -

HC- FID 0.35(.0) + 0.65(.0) = .093 G/KW HR (.032 88)

CO- NDIR 0.35(8.9) + 0.65(7.1) = 7.751 G/KW HR (5.780 88)

NOX-CL 0.35(1.9) + 0.65(2.0) = 1.982 G/KW HR (1.978 88)

HC + NOX = 2.029 G/KW HR (1.510 88)

SFC = .396 KG/KW HR (.652 88)

TABLE G-21. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

02-08-77 2:26 PM TEST 16-1 37' CAT HRS OPTIMIZED 350 CID CHEV HD ENGINE W OXI CAT K= .988 HUM= 6.6 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CRW	VAL. HM
1 IDLE	31	.003	8.89	37	8.896	1633	1	1	2	.232	.1	0	.5	0.0	997
2 25 PCT T	11	.003	12.19	136	12.199	8301	1	9	27	.077	.1	0	2.1	17.8	335
3 55 PCT T	1	.003	12.92	375	12.923	12979	0	6	107	.197	.0	1	15.7	37.0	162
4 25 PCT T	9	.003	11.72	201	11.723	7938	0	9	90	.077	.0	0	3.1	17.7	398
5 10 PCT T	15	.003	11.03	72	11.035	5992	1	3	11	.057	.1	0	.7	6.7	917
6 25 PCT T	8	.003	11.98	251	11.989	7938	1	9	51	.077	.0	0	3.9	17.7	356
7 90 PCT T	35	1.107	13.68	920	19.791	19368	5	2929	162	.113	.6	331	18.3	60.9	56
8 25 PCT T	5	.003	11.25	275	11.253	7303	0	9	53	.077	.0	0	9.1	17.0	366
9 C.T.	99	.003	.88	6	.893	0	0	0	0	.193	0.0	0	0.0	0.0	599
1 IDLE	90	.003	9.00	37	9.007	1997	1	1	2	.232	.2	0	.9	0.0	992
2 25 PCT T	28	.003	11.98	179	11.986	8079	2	9	37	.077	.2	0	2.9	17.9	351
3 55 PCT T	5	.003	12.92	375	12.923	12383	1	6	106	.197	.1	1	15.6	36.9	168
4 25 PCT T	10	.003	11.25	250	11.259	7989	1	9	99	.077	.1	0	3.8	17.9	358
5 10 PCT T	22	.003	10.90	69	10.905	5987	1	3	11	.057	.1	0	.6	6.7	919
6 25 PCT T	12	.003	11.98	299	11.989	7897	1	9	99	.077	.1	0	3.8	17.7	353
7 90 PCT T	35	1.111	13.68	301	19.795	19509	5	2959	198	.113	.6	339	16.7	60.1	58
8 25 PCT T	53	.000	11.25	250	11.256	7989	9	0	99	.077	.3	0	3.8	17.0	361
9 C.T.	99	.000	.89	7	.850	0	0	0	0	.193	0.0	0	0.0	0.0	599

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CHP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/Kw HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	17.6	0.0	0	3.6	R	R	.091	R	625	29.5	19.9	.1	1.0	5.3	0.0
2 2S	13.2	23.8	63	18.3	.769	1.1	.055	.968	2000	18.1	6.7	.1	9.9	8.9	7.6
3 5S	6.6	99.6	130	27.5	.555	2.1	.058	.338	2000	17.1	1.7	.2	32.5	25.6	30.1
4 2S	13.7	23.8	62	17.5	.736	1.7	.053	.998	2000	18.8	2.9	.1	6.9	8.5	7.6
5 10	16.9	8.9	23	13.1	1.969	1.3	.050	.893	2000	19.9	5.3	.1	1.3	9.7	2.1
6 2S	19.0	23.8	62	17.5	.736	2.1	.052	.998	2000	19.2	9.9	.1	8.2	8.5	7.6
7 90	2.2	81.1	213	42.7	.527	2.0	.067	.320	1995	15.0	61.3	99.3	37.9	30.6	37.8
8 2S	19.9	22.8	60	16.1	.706	2.3	.051	.930	2000	19.5	2.9	.1	8.9	7.8	7.3
9 CT	23.9	0.0	0	0.0	I	I	.009	I	1995	235.3	0.0	0.0	0.0	0.0	0.0
1 I	17.9	0.0	0	3.3	R	R	.091	R	625	29.2	11.1	.1	.9	9.9	0.0
2 2S	13.8	23.3	61	17.8	.769	1.6	.052	.969	2000	19.2	11.1	.1	6.0	8.8	7.5
3 5S	6.6	99.9	130	27.3	.552	2.1	.058	.336	1995	17.1	5.2	.2	32.7	25.7	30.2
4 2S	19.1	23.3	61	16.5	.708	2.1	.051	.931	2000	19.5	3.7	.1	7.9	8.1	7.5
5 10	16.5	8.9	23	13.2	1.980	1.3	.049	.900	2000	20.3	5.1	.1	1.9	9.8	2.1
6 2S	13.9	23.8	62	17.3	.727	2.0	.052	.992	2000	19.2	9.6	.1	8.0	8.5	7.6
7 90	2.3	80.6	212	43.0	.539	1.8	.067	.325	1995	15.0	39.3	99.9	35.2	31.1	37.8
8 2S	19.2	22.8	60	16.5	.723	2.1	.051	.990	2000	19.5	19.9	.0	7.9	8.1	7.3
9 CT	23.9	0.0	0	0.0	I	I	.009	I	1995	297.1	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .1 18 2.7

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .1 19 2.6

TWO CYCLE COMPOSITE -

HC- FID 0.35(.1) + 0.65(.1) = .073 G/KW HR (.054 G/B)

CO- NDIR 0.35(18.3) + 0.65(18.6) = 18.497 G/KW HR (13.793 G/B)

NOx-CL 0.35(2.7) + 0.65(2.6) = 2.637 G/KW HR (1.966 G/B)

HC + NOX = 2.709 G/KW HR (2.020 G/B)

SFC = .396 KG/KW HR (.651 P/B)

TABLE G-22. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

02-19-77 312 TEST 18-1 500 CAT HRS OPTIMIZED 350 CID CHEV HD ENGINE W OXI CAT K= .898 HUM= 6.9 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CRW	VAL. MM
1 IDLE	60	.000	9.10	39	9.107	1588	1	0	2	.232	.3	0	.9	0.0	929
2 25 PCT T	19	.000	12.93	110	12.932	8895	2	0	23	.077	.1	0	1.8	17.1	312
3 55 PCT T	8	.000	12.55	375	12.551	11929	1	0	106	.197	.1	0	15.6	35.2	190
4 25 PCT T	8	.000	12.19	199	12.191	8165	1	0	29	.077	.0	0	2.2	17.1	330
5 10 PCT T	119	.000	9.10	129	9.112	5715	8	0	29	.057	.9	0	1.9	6.0	919
6 25 PCT T	10	.000	12.07	150	12.071	8079	1	0	30	.077	.1	0	2.3	17.1	333
7 90 PCT T	16	.527	13.99	380	13.968	18507	2	1361	195	.113	.3	159	16.9	54.7	58
8 25 PCT T	8	.000	11.83	186	11.831	7902	1	0	37	.077	.0	0	2.8	17.1	393
9 C.T.	98	.000	.93	5	.990	0	0	0	0	.193	0.0	0	0.0	0.0	610
1 IDLE	95	.000	9.00	35	9.005	1997	1	0	2	.232	.2	0	.9	0.0	939
2 25 PCT T	15	.000	12.55	107	12.552	8528	1	0	22	.077	.1	0	1.7	17.1	320
3 55 PCT T	7	.000	12.80	365	12.801	12383	1	0	105	.197	.1	0	15.5	36.9	140
4 25 PCT T	10	.000	11.37	221	11.371	7620	1	0	99	.077	.1	0	3.9	16.9	398
5 10 PCT T	190	.000	9.10	126	9.115	5670	9	0	23	.057	.5	0	1.3	6.9	919
6 25 PCT T	10	.000	11.95	156	11.951	8079	1	0	31	.077	.1	0	2.9	17.2	333
7 90 PCT T	17	.569	13.99	360	13.511	18552	2	1970	137	.113	.3	166	15.5	60.2	58
8 25 PCT T	7	.000	11.37	210	11.371	7620	1	0	92	.077	.0	0	3.2	16.8	351
9 C.T.	100	.000	.93	6	.990	0	0	0	0	.193	0.0	0	0.0	0.0	610

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	16.9	0.0	0	3.5	R	R	.092	R	575	23.9	19.9	.0	1.0	5.2	0.0
2 25	12.3	22.9	60	19.5	.851	1.0	.056	.517	1995	17.8	8.6	.0	9.2	9.6	7.5
3 55	7.1	97.2	125	26.3	.557	2.2	.057	.339	1990	17.6	9.2	.0	36.9	29.8	29.5
4 25	13.0	22.9	60	18.0	.785	1.3	.055	.478	1995	18.1	3.9	.0	5.2	8.9	7.5
5 10	16.5	8.0	21	12.6	1.577	3.0	.092	.959	1995	23.9	32.6	.0	3.2	9.6	1.9
6 25	13.1	23.0	60	17.8	.775	1.3	.055	.471	1995	18.3	9.2	.0	5.9	8.8	7.5
7 90	2.3	80.1	213	90.8	.509	1.8	.065	.310	1975	15.3	19.3	99.9	38.2	29.6	38.5
8 25	13.5	22.9	61	17.2	.750	1.6	.059	.456	1990	18.6	3.3	.0	6.6	8.5	7.5
9 CT	29.0	0.0	0	0.0	I	I	.009	I	1990	223.6	0.0	0.0	0.0	0.0	0.0
1 I	17.1	0.0	0	3.3	R	R	.091	R	595	29.2	13.6	.0	.9	9.9	0.0
2 25	12.6	23.0	60	18.8	.818	.9	.057	.498	1995	17.6	6.9	.0	3.8	9.3	7.9
3 55	6.3	99.5	130	27.3	.552	2.1	.058	.336	1995	17.3	8.2	.0	35.6	25.9	30.5
4 25	13.7	22.0	58	16.8	.769	2.0	.052	.465	1995	19.9	9.2	.0	7.8	8.3	7.1
5 10	16.5	8.5	22	12.5	1.466	2.7	.092	.892	2000	23.9	39.6	.0	3.1	9.6	2.0
6 25	13.1	23.0	61	17.8	.772	1.9	.059	.470	2000	18.5	9.3	.0	5.6	8.8	7.9
7 90	2.3	80.8	213	90.9	.506	1.7	.065	.308	1990	15.3	20.5	99.9	35.7	29.8	38.3
8 25	13.8	22.5	59	16.8	.747	1.9	.052	.459	1995	19.9	2.9	.0	7.9	8.3	7.3
9 CT	29.0	0.0	0	0.0	I	I	.009	I	1990	223.6	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .1 9 2.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .1 9 2.9

TWO CYCLE COMPOSITE -

HC- FID 0.35(.1) + 0.65(.1) = .077 G/KW HR (.057 BS)

CO- NDIR 0.35(8.8) + 0.65(9.9) = 9.158 G/KW HR (6.829 BS)

NOX-CL 0.35(2.9) + 0.65(2.9) = 2.997 G/KW HR (1.825 BS)

HC + NOX = 2.529 G/KW HR (1.882 BS)

SFC = .398 KG/KW HR (.655 BS)

TABLE G-23. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

02-21-77 2:36 PM TEST 20-1 625 CAT HRS OPTIMIZED 350 CID CHEV HD ENGINE W OXI CAT K= .935 HUM= 8.1 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	MT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	179	.006	9.30	36	9.325	1819	9	2	2	.232	.9	1	.5	0.0	917
2 25 PCT T	5	.006	12.92	78	12.926	9935	0	9	18	.077	.0	1	1.9	17.6	297
3 55 PCT T	2	.006	13.93	222	13.936	12610	0	11	65	.197	.0	2	9.5	37.1	192
9 25 PCT T	5	.006	11.98	189	11.986	7399	0	8	38	.077	.0	1	2.9	16.9	351
5 10 PCT T	9	.003	11.98	59	11.986	6350	1	3	10	.057	.0	0	.6	6.9	396
6 25 PCT T	5	.003	11.72	179	11.723	7938	0	9	37	.077	.0	0	2.8	16.9	393
7 90 PCT T	29	.852	13.81	390	19.665	19051	9	2236	157	.113	.9	253	17.8	60.0	58
8 25 PCT T	9	.000	11.60	183	11.601	7989	0	0	37	.077	.0	0	2.8	17.3	398
9 C.T.	189	.000	.88	6	.899	0	0	0	0	.193	0.0	0	0.0	0.0	502
1 IDLE	198	.000	9.90	91	9.916	1819	3	0	2	.232	.7	0	.6	0.0	919
2 25 PCT T	10	.000	12.55	87	12.551	8895	1	0	19	.077	.1	0	1.5	18.0	312
3 55 PCT T	9	.000	13.92	222	13.921	13381	0	0	69	.197	.1	0	10.1	37.5	195
9 25 PCT T	6	.000	11.60	180	11.601	7620	0	0	37	.077	.0	0	2.8	17.6	398
5 10 PCT T	9	.000	11.98	56	11.981	6396	1	0	10	.057	.0	0	.6	6.0	399
6 25 PCT T	8	.000	11.60	183	11.601	7938	1	0	39	.077	.0	0	3.0	17.6	393
7 90 PCT T	25	.772	13.68	365	19.455	19051	9	2056	199	.113	.9	232	16.9	59.7	58
8 25 PCT T	7	.000	11.37	198	11.371	7711	1	0	92	.077	.0	0	3.2	16.8	351
9 C.T.	168	.000	.89	7	.857	0	0	0	0	.193	0.0	0	0.0	0.0	502

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- KW	CMP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	16.9	0.0	0	9.0	R	R	.093	R	695	23.9	59.9	.2	1.3	5.8	0.0
2 25	11.7	23.6	62	20.8	.881	.8	.058	.536	2000	17.1	2.2	.3	3.6	18.0	7.6
3 55	5.6	99.7	131	27.8	.559	1.3	.061	.390	2000	16.5	2.2	.6	29.8	25.5	30.5
9 25	13.8	22.6	59	16.3	.721	1.7	.052	.938	2000	19.2	1.9	.2	7.6	7.8	7.3
5 10	15.6	8.6	22	19.0	1.637	1.2	.052	.996	2000	19.2	2.2	.1	1.5	5.0	2.0
6 25	13.5	22.6	59	17.5	.773	1.6	.053	.970	2000	18.8	2.0	.1	7.9	8.9	7.3
7 90	2.3	80.5	211	92.0	.522	2.0	.066	.317	2000	15.1	28.1	98.5	96.9	29.6	37.9
8 25	13.7	23.1	61	16.5	.713	1.6	.053	.939	2000	19.0	1.5	.0	7.9	7.9	7.9
9 CT	22.9	0.0	0	0.0	I	I	.009	I	1995	233.8	0.0	0.0	0.0	0.0	0.0
1 I	16.5	0.0	0	9.0	R	R	.093	R	650	23.2	50.6	.0	1.5	5.7	0.0
2 25	12.3	29.2	63	19.5	.807	.8	.057	.991	2000	17.6	9.3	.0	3.8	9.2	7.7
3 55	5.7	50.3	132	29.5	.586	1.9	.060	.357	2000	16.5	9.6	.0	26.2	26.7	30.6
9 25	13.7	23.6	62	16.8	.711	1.6	.053	.932	2000	19.0	2.9	.0	7.3	8.0	7.5
5 10	15.7	8.1	21	19.1	1.750	1.2	.052	1.065	2000	19.2	2.2	.0	1.9	9.9	1.9
6 25	13.5	23.7	62	17.5	.790	1.7	.053	.950	2000	19.0	3.3	.0	7.8	8.3	7.5
7 90	2.3	80.1	211	92.0	.529	1.9	.065	.319	1990	15.3	29.7	100.0	93.7	29.2	37.5
8 25	13.8	22.5	59	17.0	.759	1.9	.052	.959	1990	19.9	2.8	.0	8.3	8.0	7.2
9 CT	22.9	0.0	0	0.0	I	I	.009	I	1990	295.1	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .1 19 2.2

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .1 13 2.2

TWO CYCLE COMPOSITE -

HC- FID	0.35(.1) + 0.65(.1) =	.080	G/KW HR	(.059 GS)
CO- NDIR	0.35(19.9) + 0.65(13.0) =	13.999	G/KW HR	(10.062 GS)
NOX-CL	0.35(2.2) + 0.65(2.2) =	2.159	G/KW HR	(1.607 GS)
	HC + NOX =	2.239	G/KW HR	(1.666 GS)
	SFC =	.909	KG/KW HR	(.672 GS)

TABLE G-24. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

02-28-77 3056 PM TEST 22-1 750 CAT HRS OPTIMIZED 350 CID CHEV W OXI CAT K= .772 HUM= 3.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOX	WT. FACT.	WEIGHTED G/HR HC-FID	CO	NOX-CL	CKW	VAC. MM
1 IDLE	53	.003	9.10	35	9.109	1819	1	1	2	.232	.3	0	.9	0.0	932
2 25 PCT T	28	.006	11.98	195	11.989	7897	2	8	39	.077	.2	1	2.6	16.7	356
3 55 PCT T	2	.006	12.80	900	12.806	12383	0	11	99	.197	.0	2	19.6	36.5	173
4 25 PCT T	7	.003	11.37	222	11.379	7575	1	9	38	.077	.0	0	2.9	16.6	363
5 10 PCT T	11	.000	11.83	57	11.831	6350	1	0	8	.057	.0	0	.9	6.3	917
6 25 PCT T	9	.003	11.98	290	11.989	7620	1	9	91	.077	.1	0	3.1	16.7	361
7 90 PCT T	32	.961	13.99	930	14.905	10829	5	2952	139	.113	.5	277	15.7	58.7	61
8 25 PCT T	3	.000	11.37	293	11.370	7589	0	0	91	.077	.0	0	3.2	16.3	366
9 C.T.	288	.000	.88	11	.909	0	0	0	0	.193	0.0	0	0.0	0.0	589
1 IDLE	53	.000	9.00	38	9.006	1819	1	0	2	.232	.3	0	.5	0.0	939
2 25 PCT T	35	.003	11.37	213	11.377	7897	3	9	38	.077	.2	0	2.9	17.6	366
3 55 PCT T	6	.003	12.80	910	12.809	12297	1	6	101	.197	.1	1	19.8	36.3	175
4 25 PCT T	19	.000	11.19	258	11.192	7620	1	0	95	.077	.1	0	3.5	17.1	361
5 10 PCT T	20	.000	11.72	58	11.722	6350	1	0	8	.057	.1	0	.5	6.3	917
6 25 PCT T	17	.000	11.37	251	11.372	7666	1	0	93	.077	.1	0	3.3	17.1	358
7 90 PCT T	36	.936	13.99	925	14.880	10829	5	2393	138	.113	.6	270	15.6	58.9	61
8 25 PCT T	8	.000	11.25	300	11.251	7620	1	0	52	.077	.0	0	9.0	17.9	361
9 C.T.	288	.000	.88	11	.908	0	0	0	0	.193	0.0	0	0.0	0.0	587

MODE	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- MV	CMP	CTQ	FC	BSFC	BSNOX	F/A	SFC KG/KW HR	RPM	CALC A/F	--------PERCENT OF TOTAL-------- HC	CO	NOX	FUEL	POWER
1 I	17.0	0.0	0	9.0	R	R	.092	R	675	23.9	23.6	.1	1.0	5.9	0.0
2 25	19.0	22.3	59	17.3	.775	1.5	.052	.971	2005	19.2	19.5	.2	6.1	8.5	7.3
3 55	6.8	98.9	129	27.3	.558	2.0	.058	.390	1995	17.3	2.8	.6	33.9	25.7	30.7
4 25	19.3	22.3	59	16.7	.750	1.7	.052	.956	2000	19.9	3.5	.1	6.8	8.2	7.3
5 10	16.9	8.9	22	19.0	1.658	.9	.059	1.008	2005	18.6	3.3	.0	1.0	5.1	2.1
6 25	19.2	22.9	59	16.8	.799	1.8	.052	.956	2010	19.2	9.5	.1	7.3	8.3	7.9
7 90	2.9	78.7	207	91.5	.527	1.8	.067	.321	1995	19.9	96.2	98.9	36.6	30.0	38.8
8 25	19.9	21.9	57	16.5	.755	1.9	.052	.959	2000	19.9	1.5	.0	7.3	8.1	7.2
9 CT	23.0	0.0	0	0.0	I	I	.089	I	2000	231.1	0.0	0.0	0.0	0.0	0.0
1 I	17.3	0.0	0	9.0	R	R	.091	R	690	24.2	18.5	.0	1.0	5.9	0.0
2 25	19.0	23.6	61	17.3	.739	1.6	.052	.996	2015	19.3	19.2	.1	6.9	8.5	7.7
3 55	6.9	98.7	128	27.0	.555	2.1	.058	.338	2000	17.3	6.5	.3	32.8	25.9	30.2
4 25	19.2	22.9	60	16.8	.739	2.0	.051	.996	2005	19.7	5.6	.0	7.7	8.3	7.9
5 10	16.9	8.5	22	19.0	1.655	.9	.053	1.007	2005	18.8	4.7	.0	1.0	5.1	2.0
6 25	19.1	22.9	60	16.9	.738	1.9	.052	.999	2005	19.9	6.7	.0	7.9	8.3	7.9
7 90	2.9	78.9	207	91.5	.526	1.7	.067	.320	2000	19.9	98.5	99.6	39.6	38.1	37.6
8 25	19.2	23.3	61	16.8	.720	2.2	.051	.938	2000	19.6	3.2	.0	8.9	8.3	7.6
9 CT	23.1	0.0	0	0.0	I	I	.089	I	2000	231.3	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .1 16 8.9

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .1 18 2.5

TWO CYCLE COMPOSITE -

HC- FID	0.35(.1) + 0.65(.1) =	.075	G/KW HR	(.056 GB)
CO- NDIR	0.35(15.9) + 0.65(15.3) =	15.449	G/KW HR	(11.559 GB)
NOX-CL	0.35(2.9) + 0.65(2.5) =	2.999	G/KW HR	(1.869 GB)
	HC + NOX =	2.575	G/KW HR	(1.920 GB)
	SFC =	.902	KG/KW HR	(.662 GB)

TABLE G-25. MASS EMISSIONS BY NINE-MODE EPA - METRIC UNITS

1975 CHEVROLET 350-CID HD ENGINE---PROJECT 11-9311

03 09 77 1056 AM TEST 23-1 POST SER ACC OPTIMIZED 350 CID CHEV W/O OXI CAT K= .810 HUM= 9.3 G/KG

MODE	CONCENTRATION AS MEASURED HC-FID	CO	CO2	NOX-CL	TOTAL CARBON	FUEL G/HR	CALCULATED G/HR HC	CO	NOx	MT. FACT.	WEIGHTED G/HR HC-FID	CO	NOx-CL	CKW	VAC. MM
1 IDLE	621	.123	8.86	39	9.050	1819	13	50	2	.232	3.1	12	.9	0.0	929
2 25 PCT T	138	.290	11.95	171	11.705	8079	11	339	32	.077	.8	26	2.9	17.5	393
3 55 PCT T	38	.071	12.58	990	12.655	12383	9	190	129	.197	.6	21	19.0	37.1	170
4 25 PCT T	56	.108	11.27	239	11.385	7666	9	197	92	.077	.3	11	3.3	17.1	353
5 10 PCT T	57	.123	11.27	59	11.900	6396	9	190	8	.057	.2	8	.5	6.0	909
6 25 PCT T	53	.119	11.98	237	11.605	7756	9	161	93	.077	.3	12	3.3	17.5	351
7 90 PCT T	36	.521	13.98	860	14.505	10869	5	1369	301	.113	.6	155	39.0	61.1	58
8 25 PCT T	39	.080	11.98	222	11.563	7575	2	105	39	.077	.2	8	3.0	16.7	356
9 C.T.	9068	.028	.33	9	.767	0	0	0	0	.193	0.0	0	0.0	0.0	589
1 IDLE	832	.083	8.61	36	8.783	1769	18	39	2	.232	9.2	8	.6	0.0	932
2 25 PCT T	200	.229	11.25	189	11.501	7938	15	320	35	.077	1.2	25	2.7	17.5	395
3 55 PCT T	59	.071	12.55	500	12.627	12928	6	191	132	.197	.9	21	19.5	37.9	170
4 25 PCT T	77	.101	11.25	249	11.360	7711	6	139	95	.077	.9	11	3.5	17.0	351
5 10 PCT T	81	.136	11.60	57	11.795	6350	5	199	8	.057	.3	8	.5	6.3	909
6 25 PCT T	66	.115	11.37	239	11.992	7989	5	151	91	.077	.9	12	3.2	17.0	351
7 90 PCT T	92	.982	11.98	860	11.967	10869	7	1535	365	.113	.8	173	41.2	60.9	58
8 25 PCT T	99	.079	11.37	231	11.959	7575	3	106	91	.077	.2	8	3.2	16.7	356
9 C.T.	3890	.027	.31	9	.722	0	0	0	0	.193	0.0	0	0.0	0.0	587

MODE	ID	----UNITS AS SPECIFIED IN THE 7-11-75 PROCEDURE---- HV	CHP	CTQ	FC	BSFC	BSNOx	F/A	BSFC KG/Kw HR	RPM	CALC A/F	---------PERCENT OF TOTAL-------- HC	CO	NOx	FUEL	POWER
1 I		16.9	0.0	0	9.0	R	R	.092	R	615	29.0	50.7	9.6	.6	5.9	0.0
2 25		13.5	23.5	61	17.8	.758	1.3	.053	.961	2005	18.8	13.2	10.2	3.7	8.7	7.5
3 55		6.7	99.7	131	27.3	.599	2.6	.057	.339	1995	17.5	9.9	8.2	28.8	25.5	30.3
4 25		13.9	22.9	60	16.9	.738	1.8	.052	.999	2000	19.3	5.2	9.5	5.0	8.3	7.3
5 10		16.1	8.0	21	19.1	1.765	1.0	.052	1.073	2005	19.3	3.3	3.2	.7	5.1	1.9
6 25		13.8	23.9	62	17.1	.730	1.8	.053	.999	2000	19.0	9.9	9.9	5.0	8.9	7.5
7 90		2.3	82.0	216	91.6	.507	3.7	.065	.309	1995	15.3	9.7	61.3	51.6	29.9	38.9
8 25		19.0	22.9	59	16.7	.795	1.7	.053	.953	2000	19.0	3.1	3.2	9.6	8.2	7.2
9 CT		23.0	0.0	0	0.0	I	I	.009	I	1995	272.3	0.0	0.0	0.0	0.0	0.0
1 I		17.0	0.0	0	3.9	R	R	.090	R	620	29.7	99.9	3.0	.6	5.8	0.0
2 25		13.6	23.5	62	17.5	.796	1.5	.052	.959	2000	19.1	19.0	9.3	3.6	8.6	7.5
3 55		6.7	50.2	132	27.9	.596	2.6	.057	.332	1995	17.5	10.9	7.8	26.3	25.7	30.6
4 25		13.8	22.8	60	17.0	.799	2.0	.052	.953	1995	19.9	5.3	9.0	9.7	8.9	7.3
5 10		16.1	8.5	22	19.0	1.655	1.0	.053	1.007	2000	18.7	3.3	3.2	.6	5.1	2.0
6 25		13.8	22.8	60	16.5	.723	1.8	.052	.990	1995	19.1	9.9	9.9	9.3	8.1	7.3
7 90		2.3	81.7	216	91.6	.509	9.9	.059	.310	1990	18.9	9.9	45.3	55.6	30.0	38.2
8 25		19.0	22.9	59	16.7	.796	1.8	.052	.959	2000	19.2	2.9	3.1	9.3	8.2	7.1
9 CT		23.1	0.0	0	0.0	I	I	.003	I	1990	289.0	0.0	0.0	0.0	0.0	0.0

SUM---(COMPOSITE VALUE FOR CYCLE 1)---------- .3 19 3.6

SUM---(COMPOSITE VALUE FOR CYCLE 2)---------- .5 15 9.1

TWO CYCLE COMPOSITE -

HC- FID 0.35(.3) + 0.65(.5) = .422 G/KW HR (.315 BS)

CO- NDIR 0.35(19.0) + 0.65(19.7) = 19.993 G/KW HR (10.770 BS)

NOX-CL 0.35(3.6) + 0.65(9.1) = 7.993 G/KW HR (2.990 BS)

HC + NOX = 9.365 G/KW HR (3.255 BS)

SFC = .395 KG/KW HR (.649 BS)

ID =

TABLE G-26. MASS EMISSIONS BY 23 MODE PROCEDURE
TEST-24 RUN-1 POST 1500 HR SERVICE ACCUMULATION

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	640	0.0	0	432	1.8	24.9	540	.085	8.60	33
2	1200	8.9	1	373	4.5	17.2	4555	1.639	10.47	23
3	1200	23.1	3	358	4.7	17.1	201	.228	12.68	31
4	1200	57.0	7	335	5.0	17.4	44	.121	12.55	45
5	1200	76.5	10	320	5.2	17.4	42	.359	11.95	64
6	1200	153.1	19	224	6.7	19.0	100	.206	11.37	620
7	1200	227.4	29	76	10.7	15.4	43	.741	13.68	230
8	1200	251.0	32	66	11.1	15.4	36	.261	13.68	365
9	1200	281.3	35	48	11.7	15.4	18	.196	13.81	625
10	1200	306.2	38	8	13.4	14.7	122	1.820	13.17	285
11	640	0.0	0	432	1.8	25.4	647	.079	8.40	33
12	1200	0.0	0	577	0.0	991.1	3490	.006	.07	3
13	2300	338.2	81	18	25.0	15.0	82	1.045	13.68	960
14	2300	311.5	75	53	22.2	16.2	8	.061	13.68	1515
15	2300	275.4	66	71	21.4	15.3	37	.818	13.68	600
16	2300	254.6	61	89	20.1	15.4	19	.558	13.81	530
17	2300	172.7	42	196	13.8	17.7	4	.032	12.43	650
18	2300	85.4	21	320	10.3	16.0	4	.029	13.85	110
19	2300	60.5	15	381	8.2	19.4	27	.100	11.25	170
20	2300	26.7	6	419	7.1	19.2	28	.097	11.37	68
21	2300	7.1	2	444	6.5	19.1	19	.073	11.48	46
22	640	0.0	0	432	1.9	25.1	561	.106	8.50	35
23	2300	0.0	0	547	0.0	544.0	2786	.003	.07	3

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	10.4	35	2.2	.070	0	3.4	R	R	R
2	162.8	1183	2.7	.060	7	4.4	145.54	1057.8	2.4
3	7.4	168	3.8	.060	17	10.4	2.53	57.4	1.3
4	1.7	47	5.4	.050	42	11.1	.24	13.6	.8
5	3.4	300	8.4	.030	56	11.4	.40	31.2	.4
6	5.8	241	119.3	.060	113	14.8	.30	12.5	6.2
7	3.2	1106	56.4	0.000	168	23.5	.11	38.6	2.0
8	2.4	421	96.6	.040	185	24.5	.04	13.3	3.1
9	1.5	332	174.0	0.000	207	25.4	.04	9.4	4.4
10	10.4	3279	84.4	0.000	226	29.5	.28	85.2	2.2
11	13.7	34	2.3	.070	0	4.0	R	R	R
12	0.0	0	0.0	.120	0	0.0	I	I	I
13	13.4	3582	540.7	.025	249	55.1	.17	44.0	6.6
14	1.3	200	813.5	.055	230	44.0	.02	2.7	10.8
15	5.5	2433	293.5	.035	204	47.1	.08	36.6	4.4
16	2.7	1575	246.1	.060	188	44.3	.04	25.7	4.0
17	1.0	72	239.6	.060	127	30.5	.02	1.7	5.8
18	.7	43	27.0	0.000	63	22.6	.03	2.1	1.3
19	1.4	145	40.6	.065	46	18.0	.13	10.0	2.8
20	1.7	121	13.4	0.000	20	15.6	.27	18.8	2.2
21	1.1	83	8.6	0.000	5	14.3	.62	48.3	5.0
22	12.1	46	2.5	.080	0	4.1	R	R	R
23	0.0	0	0.0	.060	0	0.0	I	I	I

CYCLE COMPOSITE	HC	.768	GRAM/ KW HR	(.572 GS)
	CO	22.663	GRAM/ KW HR	(16.900 GS)
	NOx	5.963	GRAM/ KW HR	(4.447 GS)
	SFC	.389	KG/ KW HR	(.640 GS)
CORRECTED	NOX	4.650	GRAM/ KW HR	(3.468 GS)

TABLE G-27. MASS EMISSIONS BY 23 MODE PROCEDURE
TEST-29 RUN-2 POST 1500 HR SERVICE ACCUMULATION

MODE	SPEED	TQ N-M	KW	MV MM	FUEL KG/HR	A/F RATIO	DRY CONCENTRATION HC	CO	CO2	NOX
1	640	0.0	0	932	1.8	29.2	1971	.115	8.70	32
2	1200	5.3	1	376	3.9	16.8	1933	.936	11.95	23
3	1200	26.7	3	356	4.8	17.1	108	.167	12.80	33
4	1200	55.2	7	333	5.0	17.3	28	.118	12.68	49
5	1200	76.5	10	317	5.2	17.7	86	.359	12.07	65
6	1200	159.9	19	229	6.6	19.1	139	.158	11.37	690
7	1200	229.6	29	76	10.7	15.2	39	.766	13.81	207
8	1200	299.2	31	66	11.1	15.4	29	.599	13.81	340
9	1200	281.3	35	48	11.7	15.7	10	.212	13.99	595
10	1200	306.2	38	8	13.2	14.9	103	1.380	13.93	305
11	640	0.0	0	937	1.8	25.2	518	.076	8.50	33
12	1200	0.0	0	574	0.0	498.7	3426	.006	.07	3
13	2300	341.8	82	18	25.0	14.9	55	.888	13.99	1035
14	2300	311.5	75	53	22.2	15.4	5	.047	13.99	1560
15	2300	277.7	67	69	21.3	15.0	29	.711	14.07	630
16	2300	254.6	61	89	20.0	15.1	11	.519	14.20	530
17	2300	170.9	41	198	13.7	17.4	6	.029	12.68	625
18	2300	85.4	21	320	10.2	16.8	7	.026	13.17	118
19	2300	60.5	15	381	8.1	19.2	25	.088	11.37	175
20	2300	26.7	6	419	7.1	19.4	33	.100	11.25	71
21	2300	7.1	2	499	6.4	19.2	29	.085	11.37	98
22	640	0.0	0	937	1.8	25.4	639	.097	8.40	33
23	2300	0.0	0	599	0.0	605.6	2690	.006	.07	3

MODE	CALCULATED GRAM/HR HC	CO	NOX	WT. FAC.	E. UNITS TQ	FC	SPECIFIC GRAM/ KW-HR HC	CO	NOX
1	29.8	97	2.2	.070	0	9.0	R	R	R
2	93.9	573	2.3	.060	9	8.7	64.65	853.5	3.9
3	9.0	125	9.1	.060	20	10.6	1.19	37.3	1.2
4	1.1	99	5.7	.050	91	11.1	.16	13.5	.8
5	3.6	300	9.1	.030	56	11.5	.37	31.2	.9
6	7.9	182	121.1	.060	119	19.5	.91	9.3	6.2
7	2.8	1122	50.5	0.000	169	23.6	.10	38.9	1.7
8	2.3	929	86.7	.040	184	29.9	.07	29.7	2.8
9	.8	359	163.3	0.000	207	25.8	.02	10.0	9.6
10	9.2	2991	90.5	0.000	226	29.2	.24	64.7	2.9
11	10.9	32	2.3	.070	0	9.0	R	R	R
12	0.0	0	0.0	.120	0	0.0	I	I	I
13	9.2	3023	579.0	.025	252	55.1	.11	36.7	7.0
14	.7	150	823.0	.055	230	99.0	.01	2.0	11.0
15	3.9	2067	301.0	.035	205	46.9	.05	30.9	4.5
16	1.5	1928	239.7	.060	188	99.2	.03	23.3	3.9
17	.6	63	223.6	.060	126	30.2	.01	1.5	5.9
18	.5	91	30.3	0.000	63	22.5	.03	2.0	1.5
19	1.8	126	91.2	.065	45	17.9	.12	8.6	2.8
20	2.1	126	14.7	0.000	20	15.6	.32	19.6	2.3
21	1.6	97	9.0	0.000	5	19.2	.94	56.3	5.2
22	13.5	92	2.3	.080	0	9.0	R	R	R
23	0.0	0	0.0	.060	0	0.0	I	I	I

CYCLE COMPOSITE	HC	.430	GRAM/ KW HR	(.321 BS)
	CO	19.363	GRAM/ KW HR	(14.439 BS)
	NOX	5.968	GRAM/ KW HR	(9.451 BS)
	SFC	.387	KG/ KW HR	(.636 BS)
CORRECTED	NOX	4.733	GRAM/ KW HR	(3.529 BS)

APPENDIX H

DRIVEABILITY AND PERFORMANCE TEST PROCEDURES AND THE SAN ANTONIO ROAD ROUTE

APPENDIX H-1. HEAVY TRUCK DRIVEABILITY RATING PROCEDURE[10]

Applicability: Truck and truck tractors above 7250 kg (16,000 lbs) GVW powered by gasoline engines and diesels intended for comparable type operation (i.e., mid-range diesel engines).

Objective: Determine for a given truck equipped with a given emission control system whether its operation, safe handling and general performance are impaired relative to the same truck without emission control driveability.

Approach: Operate a given truck without and with emission control system operative to determine on a "back-to-back" basis whether emission control deteriorated vehicle driveability as herein defined. The reference truck will be the truck in "standard" or non-emission control configuration and evaluation and comparison made against this reference for a given vehicle.

Definitions: The following are definitions of terms to be used.

1. Road Load - A fixed throttle position which maintains a constant vehicle speed on a level road.

2. Coast - Deceleration at closed (curb idle) throttle.

3. Wide Open Throttle (WOT) Acceleration - An acceleration made entirely at wide open throttle (from any speed).

4. Part Throttle (PT) Acceleration - An acceleration made at any fixed throttle position less than WOT.

5. Tip-In - Vehicle response (up to two seconds in duration), to the initial opening of the throttle.

6. Crowd - An acceleration made at a continually increasing throttle opening.

7. Idle Quality - An evaluation of vehicle smoothness, with the engine at curb idle in drive, as judged from the driver's seat.

8. Backfire - An explosion in the induction or exhaust system.

9. Hesitation - A temporary lack of initial response in acceleration rate.

10. Stumble - A short, sharp reduction in acceleration rate.

11. Lean Operation - This condition, depending on its severity, can manifest itself as outlined in the following categories:

    A. Stretchiness - A lack of anticipated response to throttle movement. This may occur on slight throttle movement from road load or during light to moderate accelerations.

    B. Surging - A condition of leanness, resulting in short, sharp fluctuations. These may be cyclic or random and can occur at any speed and/or load.

12. After-run - A condition where the engine continues to run after the ignition has been shut off.

13. Detonation (spark knock) - A knock or ping which is recurrent or repeatable in terms of audibility.

Rating Scale: The following four step rating scale will be employed where judgment is required.

Satisfactory (S) - a rating indicating no malfunction.

Trace (T) - Rating of a malfunction that is just discernible to a test driver.

Moderate (M) - Rating of a malfunction that is judged to be probably noticeable to the average driver.

Heavy (H) - Rating of a malfunction that is pronounced and judged to be obvious to any driver.

Procedure: This procedure consists of four major parts.

I. Preparations: The vehicle is to be prepared by adding sufficient weight to bring the vehicle to one-half payload using concrete blocks or drums of water. One-half payload is empty or curb weight plus one-half the nameplate GVW - curb weight. Install intake manifold pressure gage, engine rpm tach and fifth wheel with velocity and distance traveled accessories. Drain tank and use same fuel used in stationary tests. Locate truck for overnight soak 8 hr. minimum and straight out driveaway. A smooth-surface road, free of traffic interference including turns, moderate uphill, downhill but mostly level closed course will be used. The same crew must be used on all tests with a given truck.

II. Cold Start and Driveaway

This part is intended to evaluate the "cold" start and subsequent driveability of the truck before fully warmed-up. Cold soak means allowing the vehicle to sit overnight (minimum of 8 hours) at ambient temperatures of 10-27°C (50-80°F). Outdoor or indoor soak is allowed as long as all tests on a given vehicle are consistent.

Three areas of operation are to be rated, idle, acceleration and deceleration as shown by the attached data sheet. Major emphasis is given the idle quality as S, T, M, or H and number of stalls and the acceleration quality and stalls.

Using Figure 1 to depict the road course and the attached cold start driveaway data sheet, the stepwise procedure will be to:

Step 1. (Idle) Start engine using Manufacturer's Recommended Procedure. On manual choke, use as recommended and required normally. Record engine rpm in neutral immediately after start, with foot off throttle pedal. Idle 20 seconds (Note position of manual choke). During the 20 second period, evaluate idle quality and record number of stalls.

Step 2. (Idle) At end of 20 seconds, clear engine by accelerating briefly to moderately high idle speed and remove foot from throttle and record engine rpm (neutral). Evaluate quality of idle as satisfactory or rough (T, M or H) and number of stalls during 10 second idle.

Step 3. (Idle) Depress clutch and place transmission in proper low gear for driveaway. (Not normally 1st or low low). During 5 second idle, record engine rpm, evaluate idle quality and stalls.

Note: In event engine stalls during idle phase, restart engine and begin idle sequence with Step 1, Step 2, if stall occurred in Step 2 or Step 3 if stall occurred in Step 3. Also, on manual choke, use no more choke than necessary and eliminate choke use as soon as practical. Note when choke movement is made and amount of movement.

Step 4. (PT accel) A to B	Make a moderate acceleration to 40 km/h (25 mph) on level road using normal driving habit to upshift through the gears necessary to achieve a high gear from which a WOT accel to 56 km/h (35 mph) can be achieved without additional shifting. During the PT accel, record accel quality as satisfactory or in terms of T, M or H, if a malfunction is noted. If engine stalls, restart and begin at Step 3 and note same. If engine stalls again, move choke as required, note movement, and re-start at step 3.
Step 5. (Hold) B to C	Maintain 40 km/h to point C. No rating necessary during this brief downhill portion of course.
Step 6. (WOT accel) C to D	Accelerate WOT from 40 to 56 km/h in previously selected gear up slight hill to point D on course. Evaluate quality and if engine stalls, return to Step 3.
Step 7. (CT decel) D to E	Decel, foot off throttle, from 56 to 0 km/h and note quality, backfires, etc. This is a slight uphill decel.
Step 8. (PT accel) E to F	Acceleration at part throttle on level road from points E to F from 0 to 40 km/h and note quality.
Step 9. (Hold) F to G	Maintain 40 km/h to point F. No rating necessary.
Step 10. (CT decel) G to H	Deceleration at closed throttle from 40 to 0 km/h and note quality. This is a constant speed decel for most part to stop sign at H.
Step 11. (WOT accel) H to J	Accelerate at wide open throttle from 0 to 64 km/h (0 to 40 mph) and note quality on mostly level course from points H to J.
Step 12. (CT decel) I to J	Decelerate at cut throttle from 64 to 0 km/hr and note quality. This is mostly constant speed decel on downhill portion of course from I to J.
Step 13. (PT accel) J to K	Accelerate at heavy part throttle from 0 to 40 km/h and note quality over course from J through K, level road.

Step 14. (WOT accel) K to L	WOT accel from 40 to 56 km/h as in Step 6 but on level road (points K to L). Note quality.
Step 15. (Decel) L to M	Decelerate, foot off throttle, from 56 to 40 km/h into left and right turns. Note quality and backfires.
Step 16. (WOT accel) M to N	Come out of double turns (level road) from point N to O with WOT accel from 40 to 56 km/h and note quality.
Step 17. (CT decel) N to O	Decel at closed throttle to rest from 56 km/h so that vehicle is positioned for accel from stop. Note quality during decel.
Step 18. (PT accel) O to P	This is a fairly heavy part throttle accel from 0 to 40 km/h up moderate part of uphill portion of course from point O to P, note quality.
Step 19. (WOT accel) P to Q	WOT accel from 40 to 64 km/h on moderately uphill leg of course from points P to Q.
Step 20. (PT decel) Q to R	This is rapid deceleration due to uphill nature of course from Q to R. Use some light throttle to complete 64 to 0 km/h deceleration at R.
Step 21. (WOT accel) R to S	WOT accel through gears to reach 40 km/h from rest on uphill portion R to S.
Step 22. (PT Decel) S to A	This final decel returns vehicle to rest at point A (starting point) and may be made a light part throttle.
Step 23. (Idle 30 sec.)	Idle for 30 seconds, clutch pedal depressed, transmission in gear. Evaluate idle quality and record engine rpm.
	Repeat Steps 4 through 23 above to complete data sheet. The speed ranges specified can be changed based on gear selection available and performance characteristics of the truck at the discretion of the test engineer. All tests on a given vehicle are to be consistent. Evaluate driveability on all steps except steps 5 and 9.

III. Warm Vehicle Driveability

This part is intended to evaluate the driveability and performance of a fully warmed-up truck and utilizes a separate data sheet (attached). The maximum speed involved should be the legal limit of 88.5 km/h (55 mph) if this can be achieved readily with the load, etc., on level road. If not, decrease to 80.5 km/h and stay consistent with all tests on a given truck. All accels and decels to follow normal driving habit and good driving practice on upshifting and on which speed axle, etc., to use. Also, the repetitive 40 to 64 and 40 to 56 km/h accels can be shifted to other speeds depending on the capabilities of given truck at the discretion of the test engineer. All runs on given truck to be consistent.

The following stepwise procedure relates to the data sheet. The procedure begins with vehicle thoroughly warmed up with equivalent of about 16 kilometres of freeway driving.

Step 1. Idle — After completion of warm-up, allow vehicle to come to rest and begin 30 second idle. Evaluate idle quality.

Step 2. Cruise — This is a series of road load runs each made both directions over a level course and the results averaged and recorded. Use the gear which gives best overall truck operation at lower engine speed where there is option. Note quality of operation and record.

Step 3. WOT accel — Accelerate WOT with rapid fast action and throttle opening from 40 to 64 km/h in same gear used in cold start driveaway procedure. Evaluate quality.

Step 4. CT decel — Decel, foot off throttle, from 64 to 40 km/h and note quality, backfires, etc.

Step 5. WOT accel — Repeat Step 3, but with a slow deliberate foot action to achieve WOT.

Step 6. PT decel — Decelerate at very light part throttle (approximately 485 mm Hg)[a] from 64 to 40 km/h and note quality.

Step 7. PT accel — Accelerate at light constant part throttle (approximately 355 mm Hg)[a] and note quality.

[a]Use manifold vacuums which produce equivalent power output on engines using EGR.

Step 8. CT decel	Decelerate, throttle closed, from 56 to 40 km/h and note quality, backfires, etc.
Step 9. PT accel	Same as Step 7 PT accel, but with moderate constant part throttle (approximately 255 mm Hg)[a] and note quality.
Step 10. PT decel	Same as Step 8, but at very light throttle opening of about 485 mm Hg[a].
Step 11. PT accel	Same as Step 7, but with heavy constant throttle opening at about 150 mm Hg[a]. Note and record quality.
Step 12.	Same as Step 8.
Step 13. PT accel	This is part throttle crowd accel with light throttle action in that throttle is opened more with time, but at a slow or "light" rate. Evaluate quality.
Step 14.	Same as Step 6.
Step 15.	Same as Step 13, but with a moderate rate of crowd, i.e., between a slow and fast crowd.
Step 16.	Same as Step 4.
Step 17.	Same as Step 13, but with a rapid or fast rate of crowd.
Step 18.	Same as Step 14.
Step 19. PT Tip-in	Moderate part throttle accel from 40 km/h cruise. Measure time required to recognize a change in vehicle speed following initial opening of throttle plate. Repeat test after return to 40 km/h cruise for 30 seconds.
Step 20.	Same as Step 19, but from 56 km/h cruise.
Step 21. WOT accels	These are pre-conditioning runs for Steps 22 and 23 and are run in rapid succession.

[a]Use manifold vacuums which produce equivalent power output on engines using EGR.

Step 22. Immediately on completion of a CT decel from the last 0 - 88.5 km/h accel in Step 21, allow engine to idle for 30 seconds and evaluate quality.

Step 23. Soak — Cut-off engine switch and note any after-run.

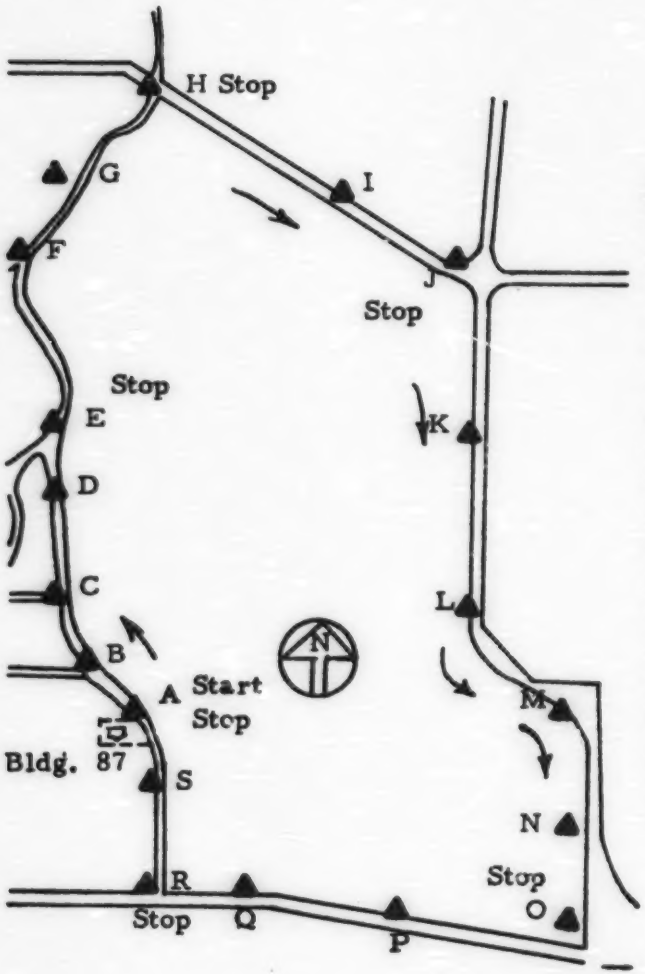
Step 24. Idle — Restart engine and allow to idle for 30 seconds, evaluate quality.

Step 25. Engine off — Cut-off ignition switch and note any after run.

IV. Accel-Decel Performance

This part is to establish acceleration and deceleration performance of the truck over level road course. Operation both ways over the course is required and results averaged. Attached is sample data sheet that is reasonably self-explanatory. Step 1 is a sequence of 0 - 32 km/h WOT accels. Steps 2 and 3 are similar WOT accels from rest. Step 4 is a WOT accel from 32 to 80.5 km/h followed by a CT decel. A ten second idle precedes each accel and a 5 second stabilization at each max speed is effected before each decel.

Step 5 will consist of measuring the max speed achieved and time required to accelerate from rest over a course starting with level road and ending with a fairly steep uphill grade. This type of driving represents the real world and is included to give some measure of performance on a grade. The same course will be used for a given truck though the course may be different for tractors than for trucks.



Point	Description	Miles	Cumulative Miles	Cumulative Km
A-B	Level curved	0.104	0.104	0.167
B-C	Sharp dwnhill curved	0.060	0.164	0.264
C-D	Steady, mod. uphill straight	0.178	0.342	0.550
D-E	Steady, mod. uphill straight	0.120	0.462	0.743
E-F	Level, curved road	0.227	0.689	1.109
F-G	Level, curved road	0.175	0.854	1.374
G-H	Mod. dwnhill, curved road	0.150	1.014	1.632
H-I	Mostly level, straight	0.315	1.329	2.138
I-J	Mod. steady, dwnhill, straight	0.181	1.510	2.430
J-K	Level, straight	0.229	1.739	2.798
K-L	Level, straight	0.240	1.979	3.184
L-M	Level, double sharp bends	0.245	2.224	3.578
M-N	Level, sharp bend and straight	0.180	2.404	3.868
N-O	Level, straight	0.161	2.565	4.127
O-P	Slight to mod. uphill, straight	0.269	2.834	4.560
P-Q	Mod. uphill, straight	0.214	3.048	4.904
Q-R	Mod. to light uphill, straight	0.140	3.188	5.129
R-S	Mod. uphill, straight	0.100	3.288	5.290
S-A	Light uphill to level, curved	0.146	3.434	5.525

APPENDIX H-1. FIGURE 1. COLD START DRIVEABILITY ROAD ROUTE

Vehicle No. _____ Engine No. _____ License No. _____
Date: _____ Time: Start _____ Finish _____ Odo.: Start _____ Finish _____
GVW: _____ kg Empty _____ kg Test Weight _____ kg

Vehicle	Weather	Crew
Make _____	Temp.: Wet/Dry °C ____/____	Driver: _____
Model _____	Bar. Press mm Hg. _____	Recorder: _____
Year _____	Road Conditions: _____	Observer(s): _____
Trans. _____ Gears	Wet _____ Dry _____	
Rear _____ Speeds	Wind: Speed _____ km/h	
Tire Size: _____	Soak Time (hrs) _____	
Remarks:		

Start Time (Sec) Attempts

			Idle			Acceleration								Decel			
			Qual			Quality								Qual			
Step	Condition	Rpm	Satis	Rough*	No. of Stalls	Satis	Hesit*	Stumble*	Stretch*	Surge*	Detonation*	No. of Stalls	No. of Backfires	Satis	Surge*	No. of Backfires	No. of Stalls
1	Fast Idle Cam 28 sec					X	X	X	X	X	X	X	X	X	X	X	X
	Clear	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	Neutral 20 sec					X	X	X	X	X	X	X	X	X	X	X	X
3	Low Gear[1] 5 sec					X	X	X	X	X	X	X	X	X	X	X	X
4	PT accel A to B (0-40)	X	X	X	X									X	X	X	X
5	Hold 40 B to C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	WOT accel C to D (40-56)	X	X	X	X									X	X	X	X
7	CT Decel D to E (56-0)	X	X	X	X	X	X	X	X	X	X	X	X				
8	PT accel E to F (0-40)	X	X	X	X									X	X	X	X
9	Hold 40 F to G	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	CT decel G to H (40-0)	X	X	X	X	X	X	X	X	X	X	X	X				
11	WOT accel H to I (0-64)	X	X	X	X									X	X	X	X
12	CT decel I to J (64-0)	X	X	X	X	X	X	X	X	X	X	X	X				
13	PT accel J to K (0-40)	X	X	X	X									X	X	X	X
14	WOT accel K to L (40-56)	X	X	X	X									X	X	X	X
15	CT decel L to M (56-40)	X	X	X	X	X	X	X	X	X	X	X	X				
16	WOT accel M to N (40-56)	X	X	X	X									X	X	X	X
17	CT decel N to O (56-0)	X	X	X	X	X	X	X	X	X	X	X	X				
18	PT accel O to P (0-40)	X	X	X	X									X	X	X	X
19	WOT accel P to Q (40-64)	X	X	X	X									X	X	X	X
20	PT decel Q to R (64-0)	X	X	X	X	X	X	X	X	X	X	X	X				
21	WOT accel R to S (0-40)	X	X	X	X									X	X	X	X
22	PT decel S to A (40-0)	X	X	X	X	X	X	X	X	X	X	X	X				
23	Idle (30 sec)					X	X	X	X	X	X	X	X	X	X	X	X

*T-Trace, M-Moderate, H-Heavy

Vehicle No. _____ Engine No. _____ License No. _____
Date: _____

			Idle			Acceleration								Decel			
			Qual			Quality								Qual			
Step	Condition	Rpm	Satis	Rough*	No. of Stalls	Satis	Hesit*	Stumble*	Stretch*	Surge*	Detonation*	No. of Stalls	No. of Backfires	Satis	Surge*	No. of Backfires	No. of Stalls
4	PT accel A to B (0-40)	X	X	X	X									X	X	X	X
5	Hold 40 B to C	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	WOT accel C to D (40-56)	X	X	X	X									X	X	X	X
7	CT Decel D to E (56-0)	X	X	X	X	X	X	X	X	X	X	X	X				
8	PT accel E to F (0-40)	X	X	X	X									X	X	X	X
9	Hold 40 F to G	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	CT decel G to H (40-0)	X	X	X	X	X	X	X	X	X	X	X	X				
11	WOT accel H to I (0-64)	X	X	X	X									X	X	X	X
12	CT decel I to J (64-0)	X	X	X	X	X	X	X	X	X	X	X	X				
13	PT accel J to K (0-40)	X	X	X	X									X	X	X	X
14	WOT accel K to L (40-56)	X	X	X	X									X	X	X	X
15	CT decel L to M (56-40)	X	X	X	X	X	X	X	X	X	X	X	X				
16	WOT accel M to N (40-56)	X	X	X	X									X	X	X	X
17	CT decel N to O (56-0)	X	X	X	X	X	X	X	X	X	X	X	X				
18	PT accel O to P (0-40)	X	X	X	X									X	X	X	X
19	WOT accel P to Q (40-64)	X	X	X	X									X	X	X	X
20	PT decel Q to R (64-0)	X	X	X	X	X	X	X	X	X	X	X	X				
21	WOT accel R to S (0-40)	X	X	X	X									X	X	X	X
22	PT decel S to A (40-0)	X	X	X	X	X	X	X	X	X	X	X	X				
23	Idle (30 sec)					X	X	X	X	X	X	X	X	X	X	X	X

*T-Trace, M-Moderate, H-Heavy

APPENDIX H-1. WARM VEHICLE DRIVEABILITY EVALUATION

Vehicle No. _____ Engine No. _____ License No. _____
Date: _____ Time: Start _____ Finish _____ Odo.: Start _____ Finish _____
GVW: _____ kg Empty _____ kg Test Weight _____ kg

Vehicle	Weather	Crew
Make _____	Temp.: Wet/Dry °C ____/____	Driver: _____
Model _____	Bar. Press mm Hg. _____	Recorder: _____
Year _____	Road Condi _____	Observer(s): _____
Trans. _____ Gears	Wet _____ Dry _____	
Rear _____ Speeds	Wind: Speed _____ km/h	
Tire Size: _____		
Remarks:		

						Idle			Drive Conditions								
						Qual			Quality								
Step	Conditions	Km/H	Gear	Rpm	Vac.	Satis	Rough*	No. Stalls	Satis	Hesit*	Stumble*	Stretch*	Surge*	Detonation*	No. Bkfires	Time, sec
1	Idle 30 sec	0	Low						X	X	X	X	X	X	X	
2	Cruise	32				X	X	X		X	X	X			X	X
	(Run both	48				X	X	X		X	X	X			X	X
	directions	64				X	X	X		X	X	X			X	X
	and average	80				X	X	X		X	X	X			X	X
						X	X	X		X	X	X			X	X
3	WOT Accel	40-64		XRapid	open XX	X	X	X							X	X
4	CT Decel	64-40		XXXX	XXXXX	X	X	X		X	X	X		X		X
5	WOT Accel	40-64		XSlow	open XX	X	X	X								X
6	PT 19 in Decel[a]	64-40		XXXX	XXXXXX	X	X	X		X	X	X		X		X
7	PT 14 in Accel[a]	40-56		XXXX	XXXXXX	X	X	X								X
8	CT Decel	56-40		XXXX	XXXXXX	X	X	X		X	X	X		X		X
9	PT 10 in Accel[a]	40-56		XXXX	XXXXXX	X	X	X								X
10	PT 19 in Decel[a]	56-40		XXXX	XXXXXX	X	X	X		X	X	X		X		X
11	PT 6 in Accel[a]	40-56		XXXX	XXXXXX	X	X	X								X
12	CT Decel	56-40		XXXX	XXXXXX	X	X	X		X	X	X		X		X
13	PT Light Crowd	40-64		XXXX	XXXXXX	X	X	X								X
14	PT 19 in Decel[a]	64-40		XXXX	XXXXXX	X	X	X		X	X	X		X		X
15	PT Mod Crowd	40-64		XXXX	XXXXXX	X	X	X								X
16	CT Decel	64-40		XXXX	XXXXXX	X	X	X		X	X	X		X		X
17	PT Heavy Crowd	40-64		XXXX	XXXXXX	X	X	X								X
18	PT 19 in Decel[a]	64-40		XXXX	XXXXXX	X	X	X		X	X	X		X		X
19	PT Tip - In 1 @	40		XXXX	XXXXXX	X	X	X								
	2 @	40		XXXX	XXXXXX	X	X	X								
20	PT Tip - In 1 @	56		XXXX	XXXXXX	X	X	X								
	2 @	56		XXXX	XXXXXX	X	X	X								
21	WOT Accels	88	XXXX	Repeat 3 times in succession												
22	Idle 30 sec	0	low						X	X	X	X	X	X	X	X
23	Soak 15 min	After Run	Yes	No					X	X	X	X	X	X	X	X
24	Idle 30 sec								X	X	X	X	X	X	X	X
25	Engine off	After Run	Yes	No					X	X	X	X	X	X	X	X

*T-Trace; M-Moderate; H-Heavy

[a]Use manifold vacuums which produce equivalent power output on engines using EGR.

APPENDIX H-1. ACCEL-DECEL PERFORMANCE

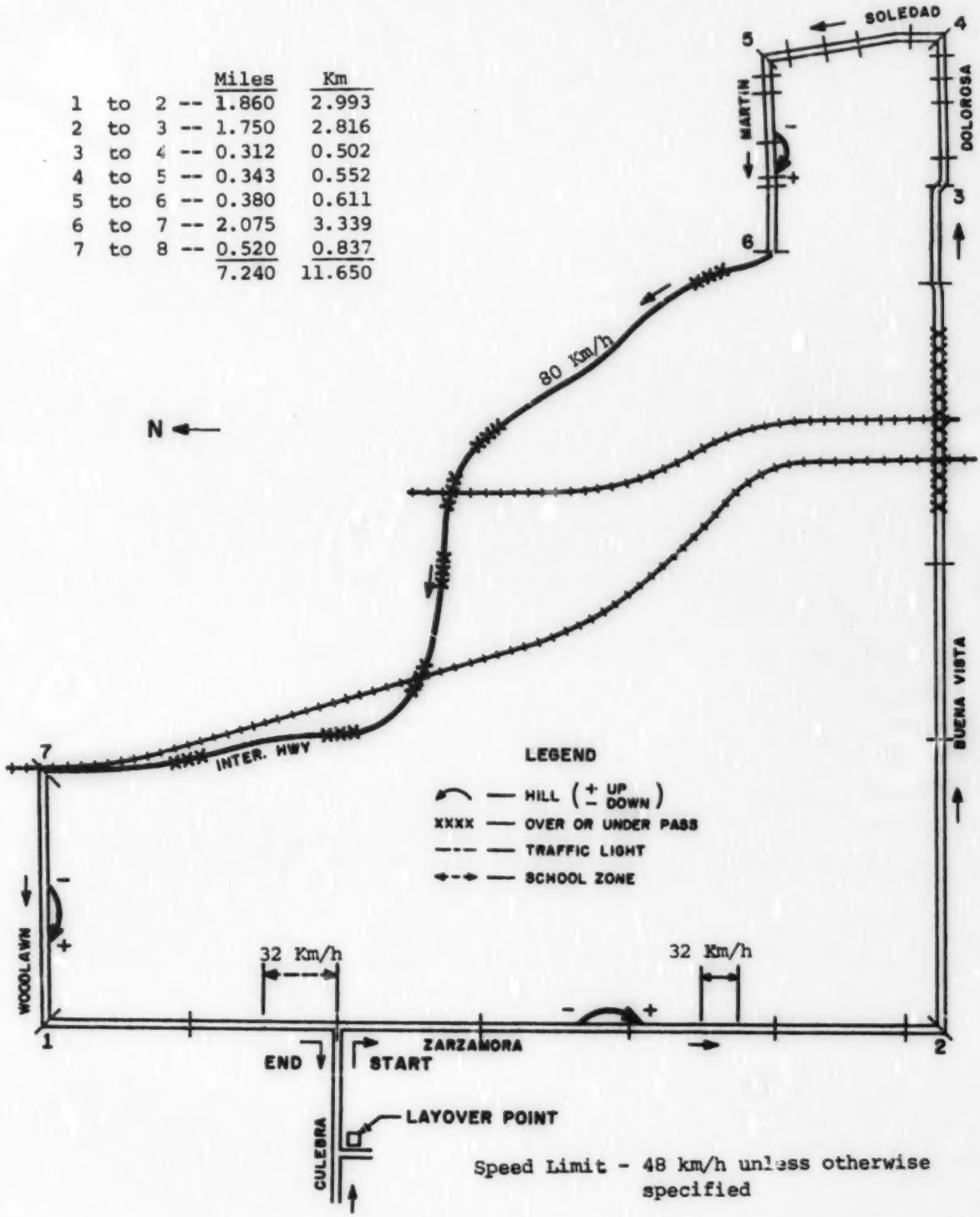
Vehicle No. _____ Engine No. _____ License No. _____
Date: _____ Time: Start _____ Finish _____ Odo.: Start _____ Finish _____
GVW: _____ kg Empty _____ kg Test Weight _____ kg

Vehicle	Weather	Crew
Make _____	Temp.: Wet/Dry °C ____ / ____	Driver: _____
Model _____	Bar. Press mm Hg. _____	Recorder: _____
Year _____	Road Conditions: _____	Observer(s): _____
Trans. _____ Gears	Wet _____ Dry _____	_____
Rear _____ Speeds	Wind: Speed _____ km/h	_____
Tire Size: _____	Soak Time (hrs) _____	_____
Remarks:		

Step	Condition	Run	km/h	Gear Start	Gear End	Time	Counts	Quality Note
(1)	WOT Accel	1	0-32					
	WOT Accel	2	0-32					
(2)	WOT Accel	1	0-64					
	WOT Accel	2	0-64					
(3)	WOT Accel	1	0-88					
	WOT Accel	2	0-88					
(4)	WOT Accel	1	32-80					
	CT Decel	1	80-32					
	WOT Accel	2	32-80					
	CT Decel	2	80-32					
			Max/Final					
(5)	Grade Perf.	1	0- /					
		2	0- /					

Idle 10 sec before each accel.
Hold max speed in accel 5 sec before each decel.

			Miles	Km
1	to	2 --	1.860	2.993
2	to	3 --	1.750	2.816
3	to	4 --	0.312	0.502
4	to	5 --	0.343	0.552
5	to	6 --	0.380	0.611
6	to	7 --	2.075	3.339
7	to	8 --	0.520	0.837
			7.240	11.650



APPENDIX H-2. SAN ANTONIO HEAVY DUTY GASOLINE[4] TRUCK ROAD ROUTE